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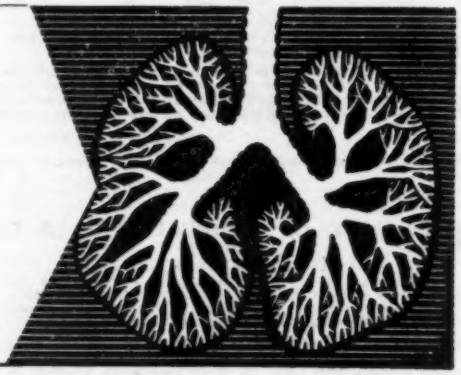

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- Intramuscular injections of Etophylate are painless

Etophylate is indicated for the treatment of cardiac, respiratory and renal conditions

Clinical reports and samples gladly sent on request

ETOPHYLATE

Presentation : Tablets, 250 mg., in bottles of 25, 100 and 500.
Suppositories, 500 mg., in boxes of 12 and 144.
Ampoules, 500 mg. in 5 cc., in boxes of 6 and 50.

ETOPHYLATE is also available with phenobarbitone and papaverine

℞

RONA LABORATORIES, 12-13, Molyneux Street, London, W.1 AMBassador 4437

Gastric Irritation AND aspirin

"ASPIRIN is a serious gastric irritant, particularly in peptic ulcer patients."

"CALCIUM ASPIRIN ... can be used with impunity, especially if prescribed in soluble form."

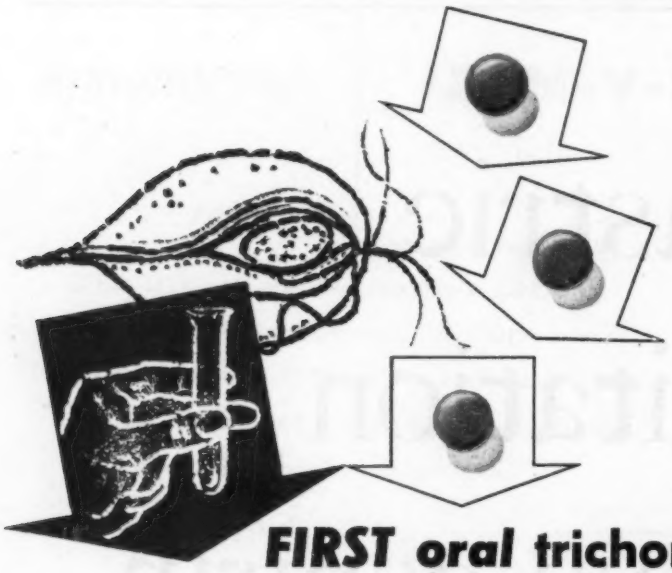
British Medical Journal, July 2nd, 1955

SOLPRIN provides calcium aspirin in pure and stable form.

CODIS is a compound tablet that provides codeine and phenacetin, and calcium aspirin which replaces the ordinary aspirin in tab. codein. co. B.P.

Neither SOLPRIN nor CODIS is advertised to the public

RECKITT & COLMAN LTD., HULL & LONDON (PHARMACEUTICAL DEPT., HULL)



FIRST oral trichomonacide

TRITHEON*

BRAND OF AMINITROZOLE TABLETS TRADE MARK

for male and female

Because of their systemic action, **TRITHEON** tablets reach resistant trichomonads in their hiding places throughout the genito-urinary tract. Unlike local trichomonacides, **TRITHEON** tablets eradicate the organism in male and female as proved by *negative culture*.

Clinical investigation has demonstrated that **TRITHEON** tablets administered orally eradicate trichomonads for **culture-proved cure** of more than 70 per cent of female patients whose husbands are treated simultaneously with **TRITHEON** tablets. Even when only the wife is treated, cures are effected in approximately one-third of the patients.

Dosage: One tablet three times daily for 10 days

Available: Bottles of 30, 180 and 1000 tablets; each tablet contains 100mg 2-acetylamino-5-nitrothiazole

LITERATURE ON REQUEST

Ortho

Ortho Pharmaceutical Limited • High Wycombe • England

* TRITHEON is the original brand of 2-acetylamino-5-nitrothiazole tablets developed in the Ortho Research Foundation for the oral treatment of trichomoniasis

Gypsona
TRADE MARK

has stood the test of time

Soaks more readily than hand-rolled bandages.

Sets firmly in four to five minutes.

Stronger yet less brittle than ordinary plaster.

Casts have porcelain-like surface.

Casts are porous.

Trimmed edges do not crumble and casts have a neat appearance.

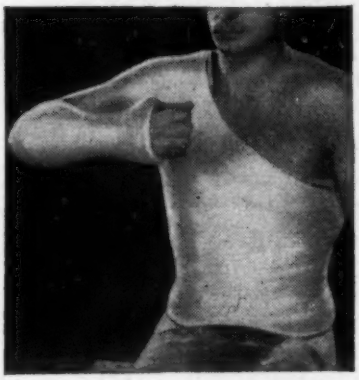
Casts may be bivalved, or cut open and sprung apart without loss of strength.

Exact number of bandages for a particular cast can be determined beforehand.

Special interlocked woven cloth permits easy moulding.

High plaster content—90% of plaster by weight.

Will keep for a very long time without deterioration when stored in a dry place.



The absence of loose powder and the non-fray edges of the specially-woven leno cloth base of Gypsona bandages provides a distinct advantage over hospital-made bandages.

In performance, the superiority of Gypsona is even more marked. The high plaster content is fixed to the fabric by a special process, and there is a negligible loss of plaster when the bandage is soaked. A surprisingly small amount of material will produce a cast which is light, but of great strength.

Gypsona is by far the most economical plaster for the modern functional treatment of fractures.

SMITH & NEPHEW LTD · WELWYN GARDEN CITY · HERTS 1856 S&N 1956 **Gypsona** TRADE MARK

VIMALTOL

A VITAMIN FOOD SUPPLEMENT OF WIDE APPLICATION

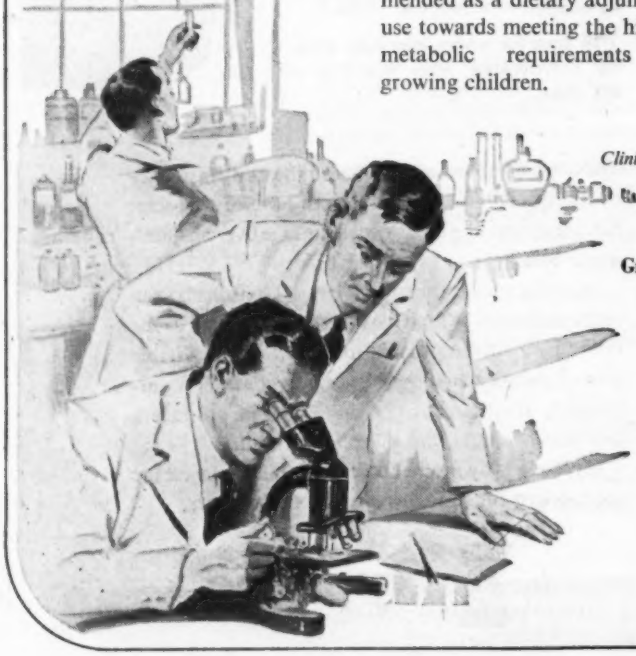
'VIMALTOL' is a delicious vitamin food concentrate of value to infants, children and adults. Its formula has been developed in the 'Ovaltine' Research Laboratories in the light of prolonged investigations by scientific experts in the field of dietetics. The malt extract, yeast, halibut liver oil, vitamins and iron in 'Vimaltol' are presented in a palatable and easily digested form, which is taken readily over long periods.

When the quantity of vitamins supplied by the diet is known or suspected to be insufficient, 'Vimaltol' will provide some of the essential accessory factors to help to render the diet balanced and adequate.

'Vimaltol' is widely recommended as a dietary adjunct of use towards meeting the higher metabolic requirements of growing children.

Standardized to contain in each ounce not less than

2000 i.u. Vitamin A;
200 i.u. Vitamin D;
0.4 mg. Vitamin B_1;
0.3 mg. Vitamin B_2 (Riboflavin);
4 mg. Niacin (P.P. Vitamin);
3.3 mg. Iron
in a readily assimilable form.

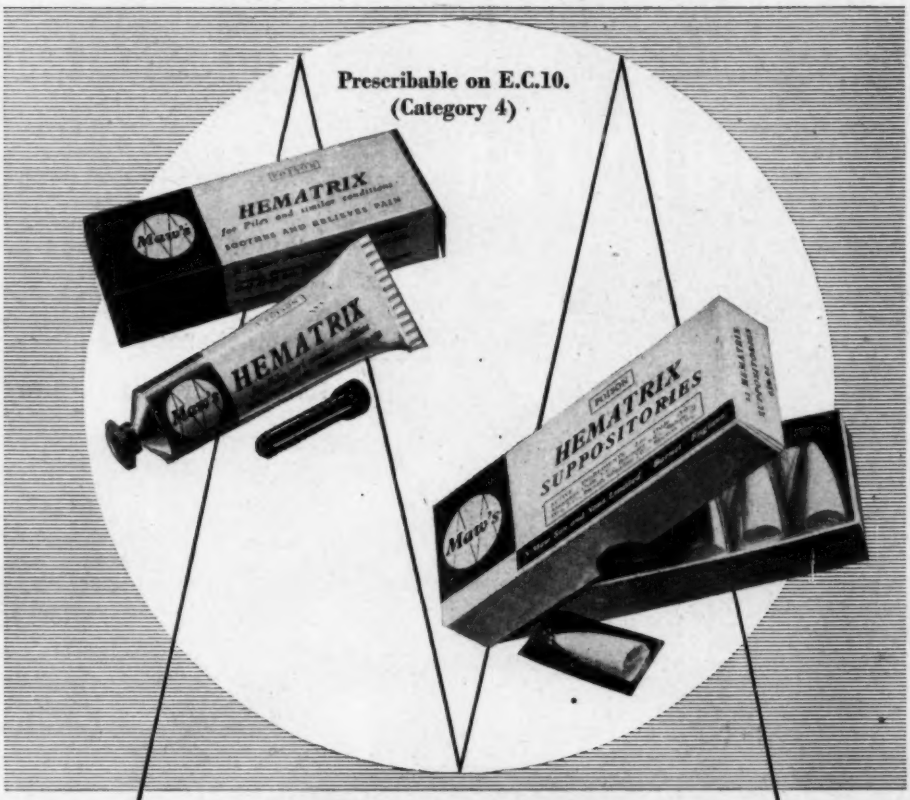


Clinical samples on physicians' request to The Medical Dept.,

A. WANDER LIMITED
42 Upper Grosvenor Street,
Grosvenor Square, London W.1.

A Product of the 'Ovaltine' Research Laboratories

M.378



For the treatment of haemorrhoids, pruritus ani, and inflammatory eczematous lesions in the anal region.

Hematrix Ointment

HEMATRIX is designed for the immediate relief of itching and localised pain through progressive treatment of the enlarged and varicose tissues by mild antacid astringent action. HEMATRIX acts promptly, effectively and thoroughly, promoting the disappearance of subjective symptoms.

Hematrix Ointment is presented in a tube with an applicator for internal use, and contains:

BENZOCAINE	6%
ALUMIN. OXIDE	7·5%
ZINC OXIDE	15%
BALSAM PERU	2·5%

Hematrix Suppositories

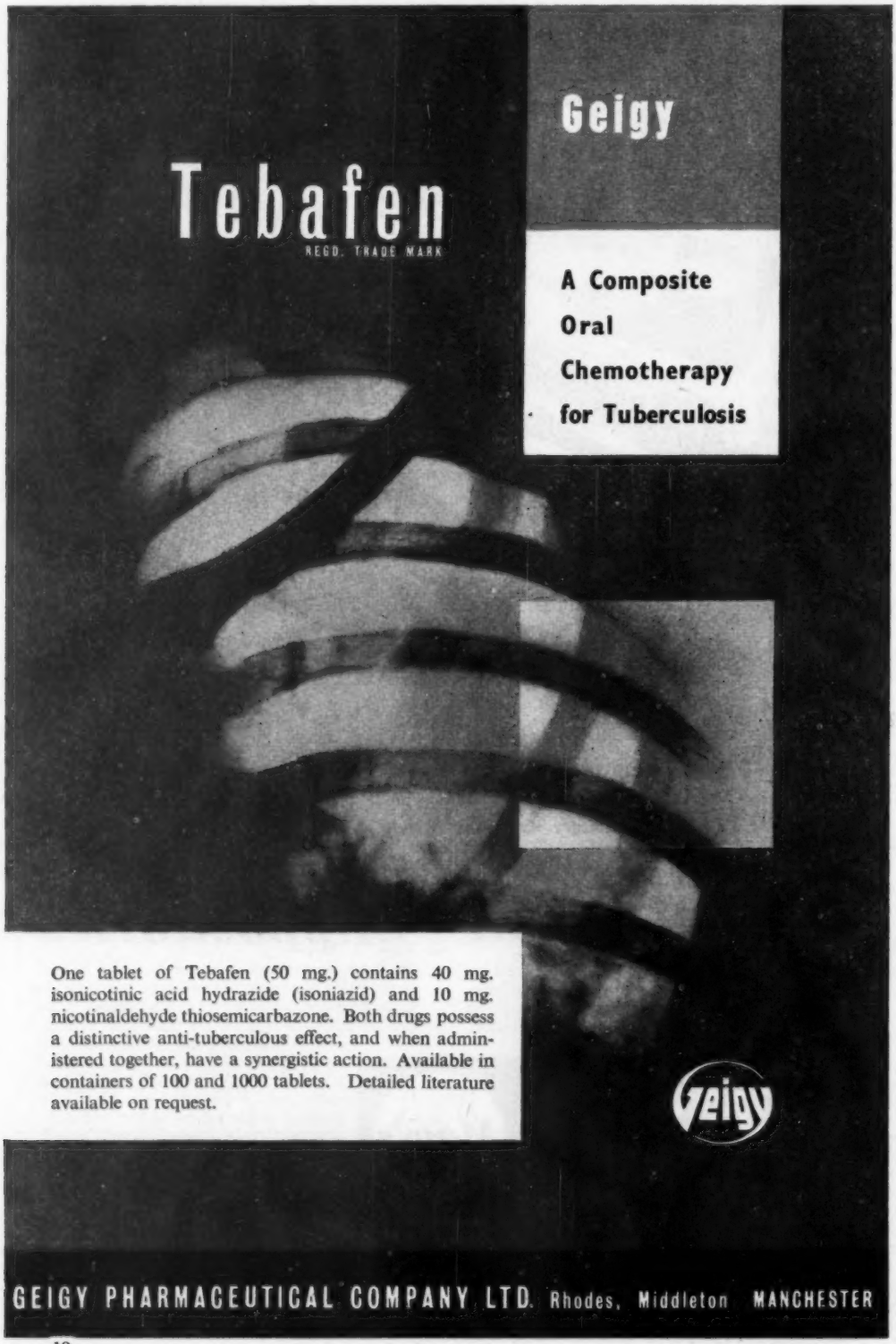
An alternative method with the inclusion of Bismuth Subgallate and Resorcin in the formula gives added value in pruritus and sepsis. Also gives maximum relief from pain and itching.

The distinctive straight-sided, conical shape is selected for giving prolonged contact with the anal canal, and greatest ease of insertion. The more gradual displacement of the orifice so permitted is of marked benefit where fissure is present.

Each suppository is plaquetted in transparent acetate and supplied in boxes of 12.

Maw's

S Maw Son and Sons Limited Barnet England


Geigy
Tebafen
REGD. TRADE MARK
A Composite
Oral
Chemotherapy
for Tuberculosis
One tablet of Tebafen (50 mg.) contains 40 mg. isonicotinic acid hydrazide (isoniazid) and 10 mg. nicotinaldehyde thiosemicarbazone. Both drugs possess a distinctive anti-tuberculous effect, and when administered together, have a synergistic action. Available in containers of 100 and 1000 tablets. Detailed literature available on request.
Geigy
GEIGY PHARMACEUTICAL COMPANY LTD. Rhodes, Middleton MANCHESTER

Shortening the convalescence

The worst is over—the patient is back on his feet again. But there is still some way to go from convalescence to a normal active life. It is at this stage that Lederle's new STRESSCAPS Stress Formula Vitamins can help the patient so much. STRESSCAPS provide in a single capsule a supplement of vitamins needed to hasten recovery and body repair when the patient is subjected to extraordinary physiological stress by shock, injury, burns, surgery or severe infection. STRESSCAPS Capsules are dry-filled thereby eliminating unpalatable after-taste. The average dose is one capsule daily.

STRESSCAPS*

Stress Formula Vitamins

Lederle

Each capsule contains:

Thiamine Mononitrate (B_1)	10 mg.
Riboflavine (B_2)	10 mg.
Niacinamide	100 mg.
Ascorbic Acid (C)	300 mg.
Folic Acid	5 mg.

STRESSCAPS are available in bottles of 30.

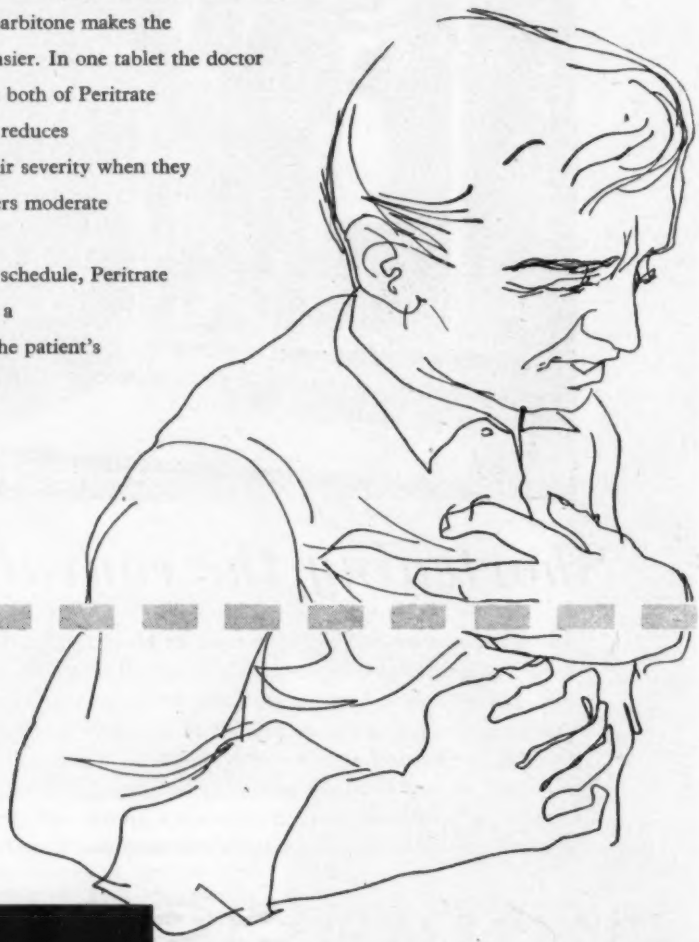
* Trade Mark

LEDERLE LABORATORIES DIVISION

Cyanamid PRODUCTS LTD. **LONDON, W.C.2**

For Anxiety in Angina Pectoris

Does mental tension cause angina pectoris—or do the attacks themselves lead to nervousness?
Whatever the answer, mental strain often accompanies cardiac distress. Peritrate with Phenobarbitone makes the management of angina cases easier. In one tablet the doctor can make use of the properties both of Peritrate and Phenobarbitone. Peritrate reduces the number of attacks, and their severity when they come, and phenobarbitone offers moderate sedation to allay anxiety.
Taken on a continuing dosage schedule, Peritrate with Phenobarbitone produces a considerable improvement in the patient's condition and outlook.



Peritrate *WITH PHENOBARBITONE*

TRADE MARK

ACTIVE PRINCIPLES: *Pentaerythritol tetranitrate 10 mg. Phenobarbitone 15 mg.* DOSE: *1 tablet four times a day.*
PACKING: *Bottles of 50 tablets. Bottles of 500 tablets supplied to chemists for dispensing.*

WILLIAM R. WARNER & CO. LTD., POWER ROAD, LONDON, W.4.

VISTER

VISMARA TERAPEUTICI
CASATENOVO (COMO) ITALY

evidence collected over two years has confirmed the value of

antemovis

anti-haemorrhagic factor of platelets
in controlling bleeding in medical and surgical conditions

available in boxes of 5 ampoules of 5 mg of double sulphate of 5-hydroxytryptamine and creatinine

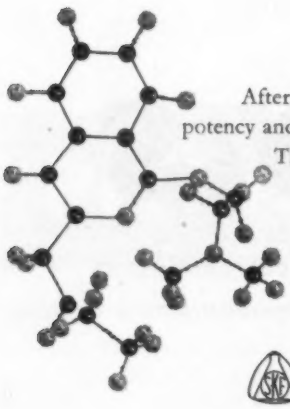
for intravenous, intramuscular, topical use

Literature on request

*N 15

an effective answer to anogenital itching and pain

'The high anesthetic potency of dimethisoquin makes it of unique value as an antipruritic for the relief of itching and pain . . .' The Pharmacological Basis of Therapeutics (*1955*), *2nd ed. New York: The Macmillan Company, p. 370.*



After developing and screening hundreds of anaesthetic compounds for potency and safety, SKF isolated dimethisoquin hydrochloride—'Quotane'.

This remarkable surface anaesthetic has these advantages:

1. Rapid and long-lasting relief of itching and pain.
2. Low sensitization index. 'Quotane' is not related to the highly sensitizing 'caine' group.
3. Smooth, white, non-staining and non-greasy.

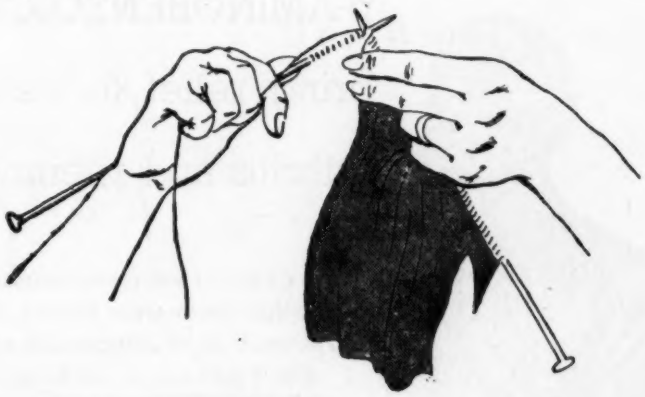
QUOTANE OINTMENT

Smith Kline & French

represented by Menley & James, Limited, London S.E.5

QOP76

ANTE-NATAL



POST-NATAL

VITEPRON

capsules containing readily assimilable iron and the natural Vitamins of the B complex give all the additional haematic factors necessary during pregnancy and lactation to maintain maximum well being for mother and child.

Literature and samples on request

PAINES & BYRNE LTD., Greenford, Middlesex

The esters of NICOTINIC, SALICYLIC and p-AMINOBENZOIC acids bring relief to cases of arthritis and rheumatism

"Thank you, doctor"

IN CASES OF soft-tissue rheumatism, and arthritic disorders, many doctors are tending more and more to regard Transvasin as an indispensable adjuvant to treatment.

For Transvasin is composed of the esters of nicotinic, salicylic and p-aminobenzoic acids. These esters readily pass the skin barrier in therapeutic quantities, and so enable an effective concentration of drugs to be built up where they are needed.*

Transvasin not only induces vasodilation of the skin with a superficial erythema, but also brings about a deep hyperaemia of the underlying tissues. It is non-irritant and can be safely used on delicate skins.

It is now being widely prescribed, with successful clinical results. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low.

**Therapeutische Umschau VIII, 1952, 10, 143.*

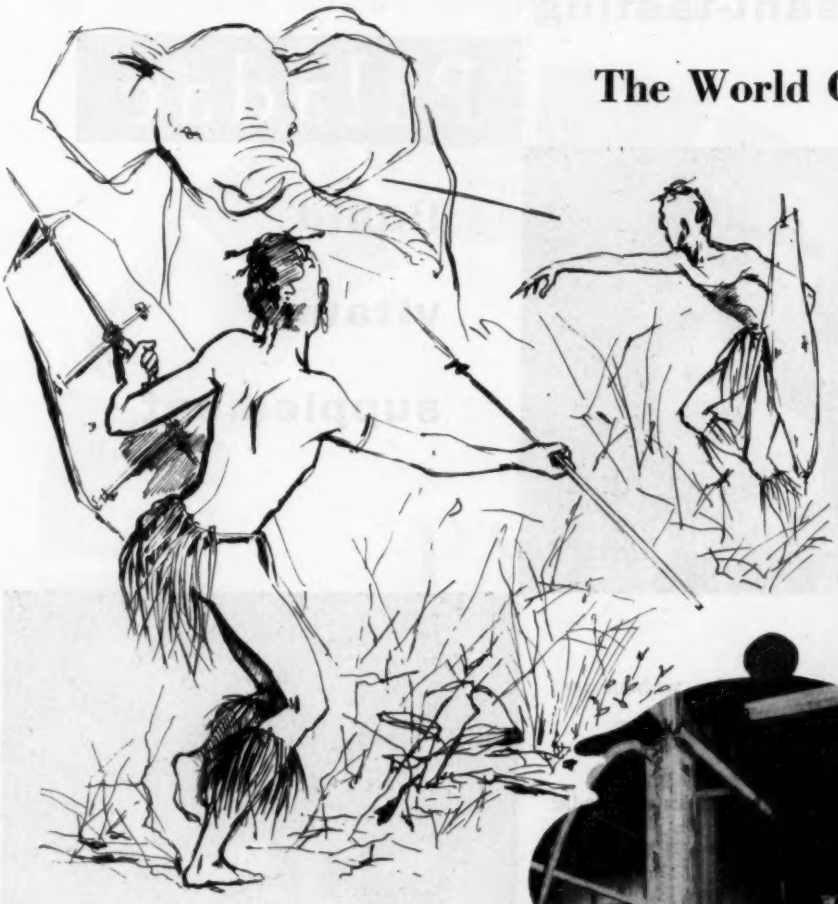
Salicylic acid tetrahydrofurfuryl-ester...	14%
Nicotinic acid ethyl-ester.....	2%
Nicotinic acid n-hexyl-ester.....	2%
p-Aminobenzoic acid ethyl-ester.....	2%
Water-miscible cream base ad	100%

Transvasin is available in 1 oz. tubes, basic N.H.S. price 2/6 plus P.T., and is not advertised to the public. Samples and literature will be glady sent on application.

LLOYD-HAMOL LTD

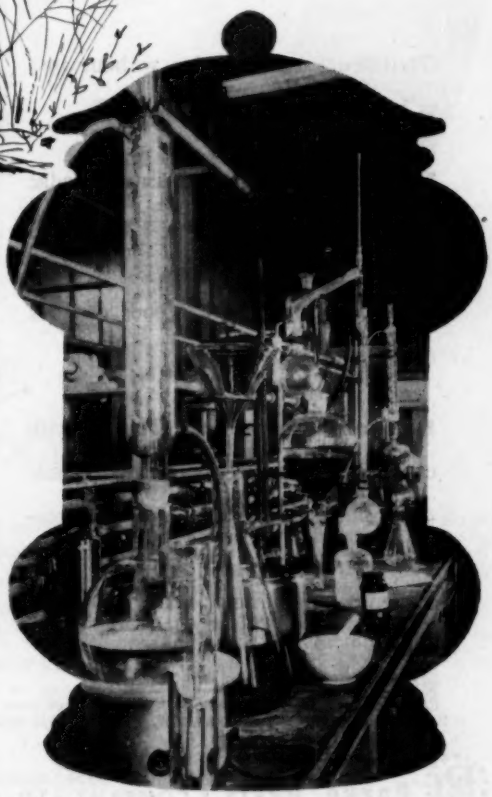
11 Waterloo Place, London, S.W.1. Tel. WHitehall 8654/5/6

Transvasin is the registered trade mark of Lloyd-Hamol Ltd.



The World Over

Tanganyika...



The scientific, cultural and commercial organization of a Pharmaceutical House with more than a century of experience assures Physicians and Scientists of an ever prompt and efficient co-operation in the eternal struggle for the health of Mankind.

CARLO ERBA MILANO

ESTABLISHED: 1853

pleasant-tasting

Paladac

liquid vitamin supplement

Children take Paladac without fuss or bother because it "tastes good".

Mothers like to give it because Paladac is readily accepted, flows freely, needs no refrigeration, and may be added to milk, fruit juice and other foods, or taken direct from a teaspoon.

Doctors can prescribe Paladac with confidence since it provides a reliable daily source of vitamins—one 4 c.c. teaspoonful supplies 7 vitamins in amounts exceeding minimum daily vitamin requirements.

Primarily intended for the 3-10 age-group, Paladac is equally suitable for adolescents and adults where liquid medication may be preferred.

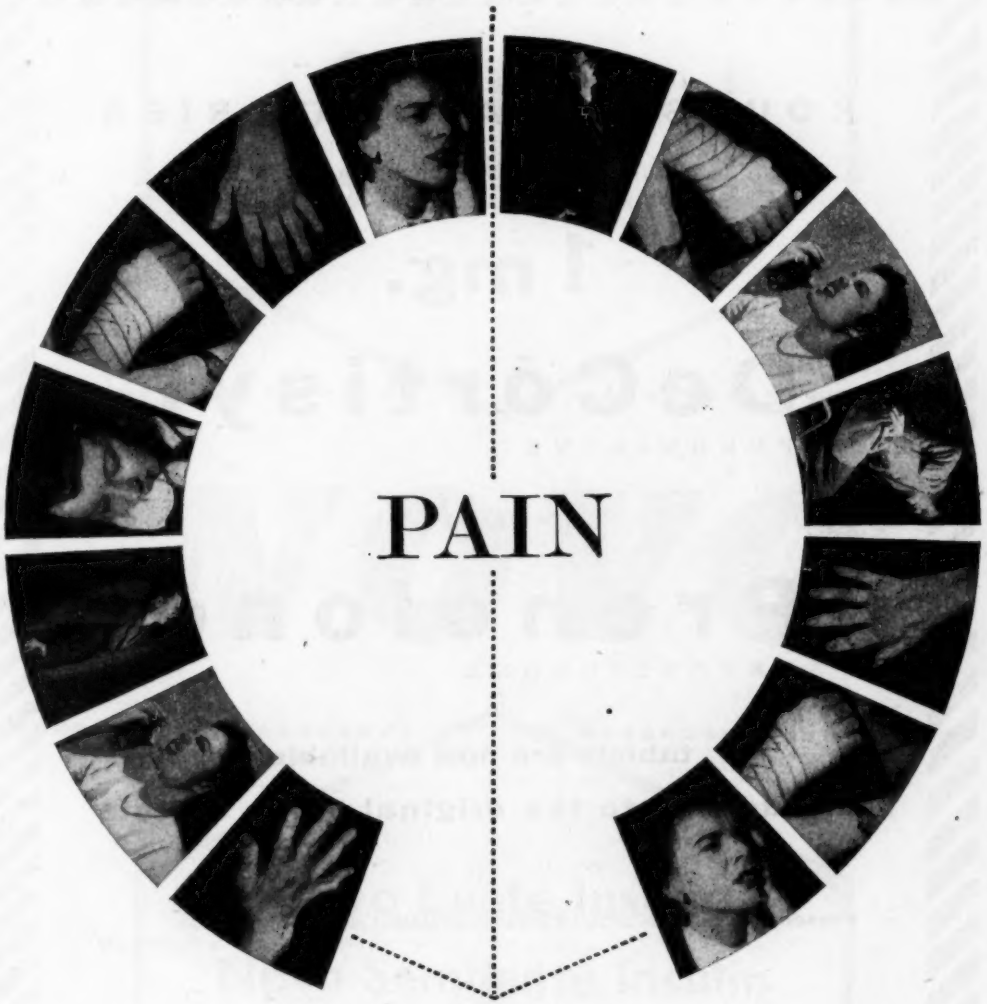
Paladac is supplied in bottles of 4 and 16 fl. ozs.

Each teaspoonful (4 c.c.) contains:— Vitamin A 5,000 units, Vitamin D 1,000 units, Vitamin B_1 (Aneurine Hydrochloride) 3 mg., Vitamin B_2 (Riboflavin) 3 mg., Vitamin B_6 (Pyridoxine Hydrochloride) 1 mg., Nicotinamide 20 mg., Vitamin C (Ascorbic Acid) 50 mg.

Parke, Davis & COMPANY, LTD. *(Inc. U.S.A.) Hounslow, Middlesex. Tel: Hounslow 2361*

700

an all-round defence against



in all its phases

The relief of pain is rightly the patient's just insistence. Effective alleviation may be obtained in many pain producing conditions which increase seasonally. Rheumatism, lumbago, arthritis, coryzal and influenzal aches are but some of the common ailments which call for a rapid form of therapy. Hypon Tablets fulfil the requirements of a safe analgesic without any untoward side effects being experienced. Caffeine and phenolphthalein present in Hypon Tablets ensures a preparation which is the best in its category

FORMULA: *Acid Acetylsalicyl B.P. 40.22% Phenacet. B.P. 48.00% Caffein B.P. 2.00% Codein. Phosph. B.P. 0.99% Phenolphthal. B.P. 1.04% Excip. 7.75% (each tablet 8 grains)*

HYPON TABLETS

Prescribe Hypon Tablets by name

CALMIC LIMITED, CREWE. *Phone CREWE 3251-5* **LONDON:** *2 Mansfield St., W.1. Phone LANgham 8038-9*

AUSTRALIA: 458-468 Wattle Street, Ultimo, Sydney, N.S.W. **CANADA:** Terminal Buildings, York St., Toronto.

H2

ROUSSEL LABORATORIES

have pleasure in announcing that

1 mg.

DeCortisyl

PREDNISONE

and

Prenolone

PREDNISOLONE

tablets are now available

in addition to the original 5 mg. tablets

Presentations: DeCortisyl & Prenolone Tablets 1 mg. In bottles of 100
" " " " 5 mg. " " " 30, 100 & 500

(Supplies of DeCortisyl and Prenolone in U.K. are currently limited to hospitals).
The products are in free supply for export.

ROUSSEL

LONDON N.W.10

L-S.12

The original Lente Insulins

NOVO

Novo Lente Insulin

Novo Semilente Insulin

Novo Ultralente Insulin

All available in 40 and 80 units per ml.

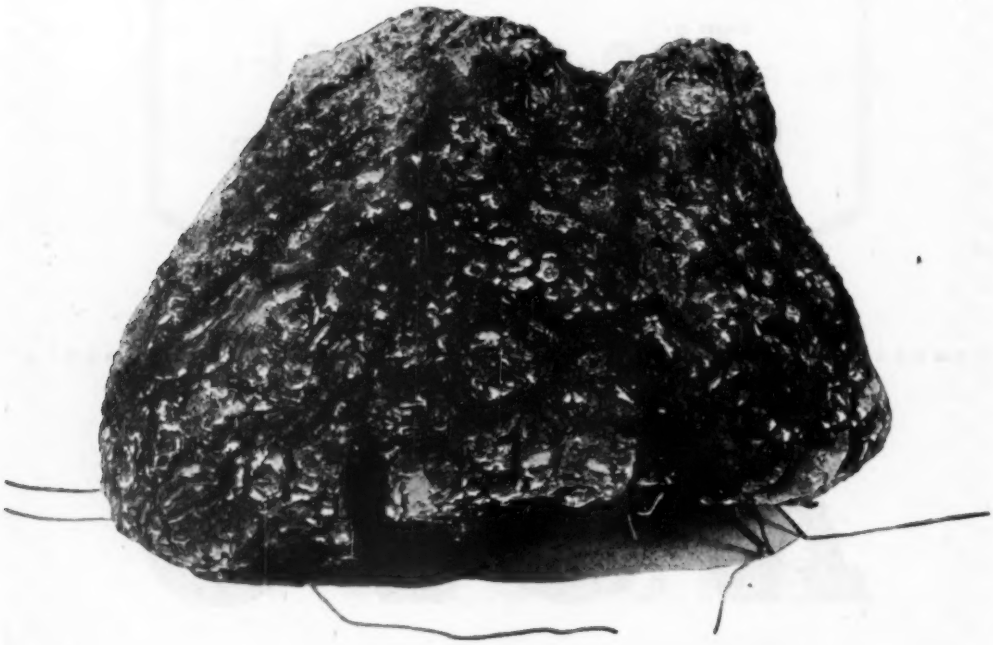
EVANS MEDICAL

EVANS MEDICAL SUPPLIES LTD.

SPEKE, LIVERPOOL 19 (HUNTS CROSS 1881)

London Office: Ruislip, Middlesex (Ruislip 3333)

From Elephant's Foot...



...to CORTISONE

an all-British achievement by BOOTS

"Elephant's Foot" is the name given to a South African root, the all-important source of Diosgenin. This is the basic material used for the synthesis of Boots Cortisone and its derivatives.

Thanks to this oddly-named root, Boots are assured of a plentiful supply of the raw material for an all-British Cortisone from non-dollar sources.

BOOTS CORTICOID PREPARATIONS

CORTISTAB
(*Cortisone Acetate*)
TABLETS · INJECTION · EYE DROPS · EYE OINTMENT

HYDROCORTISTAB
(*Hydrocortisone*)
TABLETS · INJECTION (Local) · INJECTION (Intravenous)
SKIN OINTMENT · EYE OINTMENT · EYE DROPS

DELTA-STAB
(*Prednisolone*)
(*delta-1-Hydrocortisone*
TABLETS

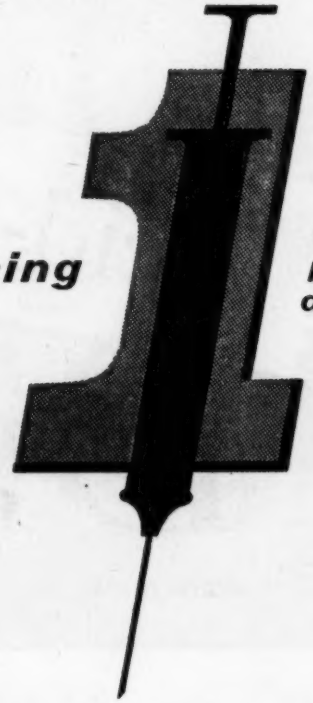
Delta-Stab Tablets are at present available through N.H.S. Hospitals only by arrangement with the Ministry of Health.

Boots *all-British* CORTISONE PREPARATIONS

BOOTS PURE DRUG COMPANY LIMITED · NOTTINGHAM · ENGLAND

8340

announcing



the new one-dose post-operative analgesic

PROLADONE

Dihydronydroxycodeinone pectinate

Clinical trials have shown that, in most cases, satisfactory post-operative pain control is obtained with one injection.

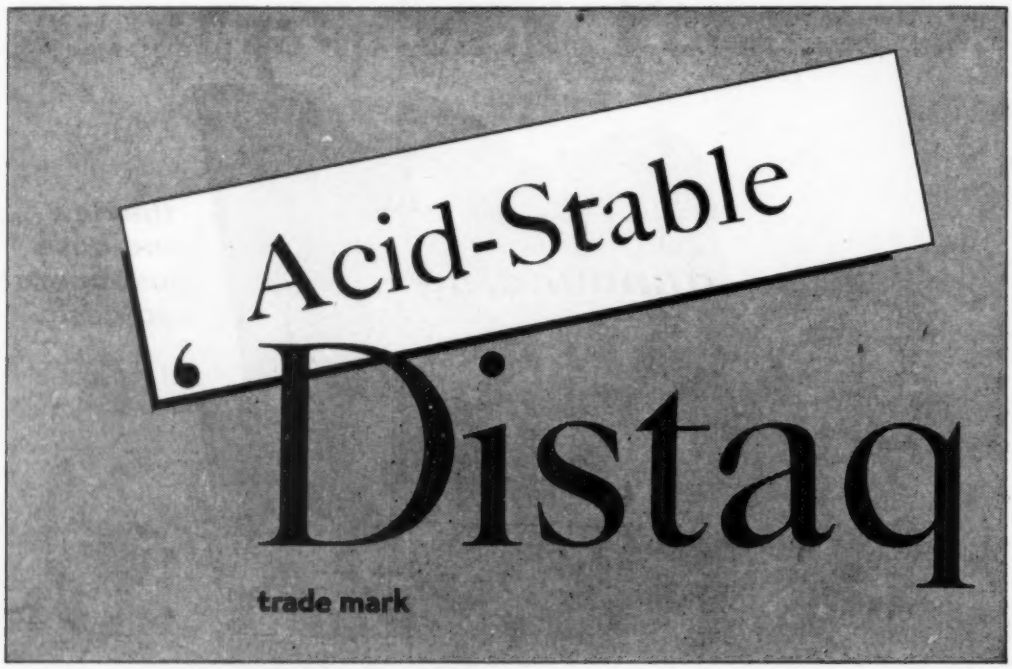
DOSE: *1 ml by intramuscular injection.*
PACKING: *1 ml. ampoules in boxes of six.*
CLINICAL SAMPLES *are available for trial on request.*
This product is controlled by the D.D.A. Regulations and requests for samples must be worded accordingly.

PROLADONE

TRADE MARK

long acting analgesic

THE CROOKES LABORATORIES LIMITED · PARK ROYAL · LONDON · N.W.10



crystalline penicillin V, free acid

'Distaquaine' V, containing crystalline penicillin V (free acid form), is unaffected by the gastric acidity and for this reason alone is to be preferred to other penicillins for oral administration. Furthermore, it is efficiently absorbed and offers a reliable alternative to parenteral penicillin therapy. Three preparations are available.

Manufactured by

THE DISTILLERS COMPANY *(Biochemicals)* LIMITED

SPEKE, LIVERPOOL 19. TEL: HUNTS CROSS 1271

Export Department: Devonshire House, Piccadilly, London, W.1. Tel: Mayfair 8867

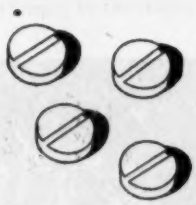
The trademark 'Distaquaine' is the property of the manufacturers

PPH 24/56 2

The *preferred* Oral Penicillin

uaine'V

'Distaquaine' V TABLETS



60 mg. scored tablets
Bottles of 30, 200 and 1,000

DOSAGE

Adults—One or more tablets at four-hourly intervals.
Children—Half the adult dose.

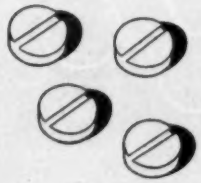
'Distaquaine' V ELIXIR

30 mg. dose (1.75 ml.)
Bottle of 2 fl. oz. (30 doses). A plastic spoon of 1.75 ml. (½ fl. dr.) is provided.

DOSAGE

Children—One or more spoonfuls (30 mg.) at four-hourly intervals.
Adults—At least two spoonfuls (3.5 ml. = 1 fl. dr.) at four-hourly intervals.

'Distaquaine' V SULPHA



Each scored tablet contains
60 mg. penicillin V, 0.30 gramme sulphadimidine and 0.14 gramme sulphamerazine.
Bottles of 30, 200 and 1,000

DOSAGE

Adults—Two tablets initially, followed by one or two tablets at four-hourly intervals.
Children—Half the adult dose.

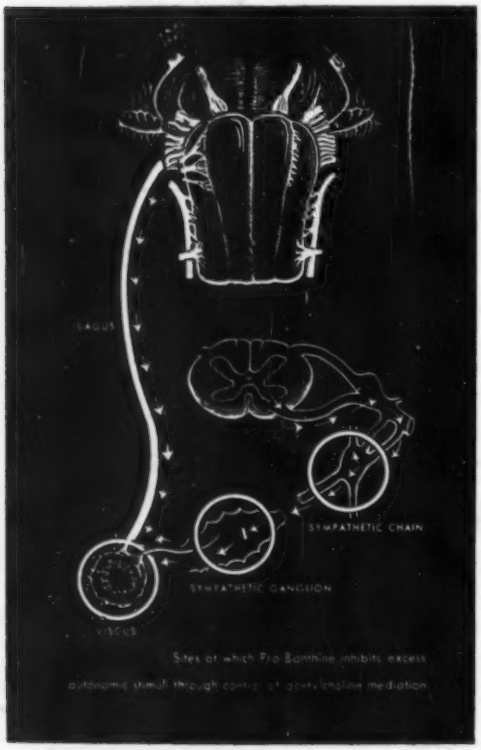
PRO-BANTHĪNE* FOR ANTI-CHOLINERGIC ACTION

A Combined Neuro-Effector and Ganglion Inhibitor

Pro-Banthīne consistently controls gastro-intestinal hypermotility and spasm and the attendant symptoms.*

Pro-Banthīne is an improved anti-cholinergic compound. Its unique pharmacological properties are a decided advance in the control of the most common symptoms of smooth muscle spasm in all segments of the gastro-intestinal tract.

By controlling excess motility of the gastro-intestinal tract, Pro-Banthīne has found wide use[1] in the treatment of peptic ulcer, functional diarrhoeas, and regional enteritis and ulcerative colitis. It is also valuable in the treatment of pylorospasm and spasm of the sphincter of Oddi.



Sites at which Pro-Banthine inhibits excess autonomic stimuli through control of neuro-effector mediation

It was found[2] that Pro-Banthīne orally was an "inhibitor of spontaneous and histamine-stimulated gastric secretion" which "resulted in marked and prolonged inhibition of the motility of the stomach, jejunum and colon . . ."

Therapy with Pro-Banthīne is remarkably free from reactions associated with para-sympathetic inhibition. Dryness of the mouth and blurred vision are less severe with Pro-Banthīne than with certain other potent anti-cholinergic agents.

In the above series[2], "Side effects were entirely absent in single doses of 30 or 40 mg. . . ."

Pro-Banthīne Bromide (2′-diisopropylamino-ethyl xanthene-9-carboxylate methobromide) brand of propantheline bromide, is available in sugar-coated tablets of 15 mg.

For the average patient one tablet of Pro-Banthīne (15 mg.) with each meal and two tablets (30 mg.) at bedtime will be adequate. Full literature is available on request. G. D. Searle, & Co. Ltd., 83, Crawford Street, London, W.1.

* *Registered Trade Mark.*

[1]Gastroenterology (1953) 25 : 416.
[2]Gastroenterology (1953) 25 : 24.

SEARLE

PB : P96

Dulcolax
Regd. Trade Mark

(4, 4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

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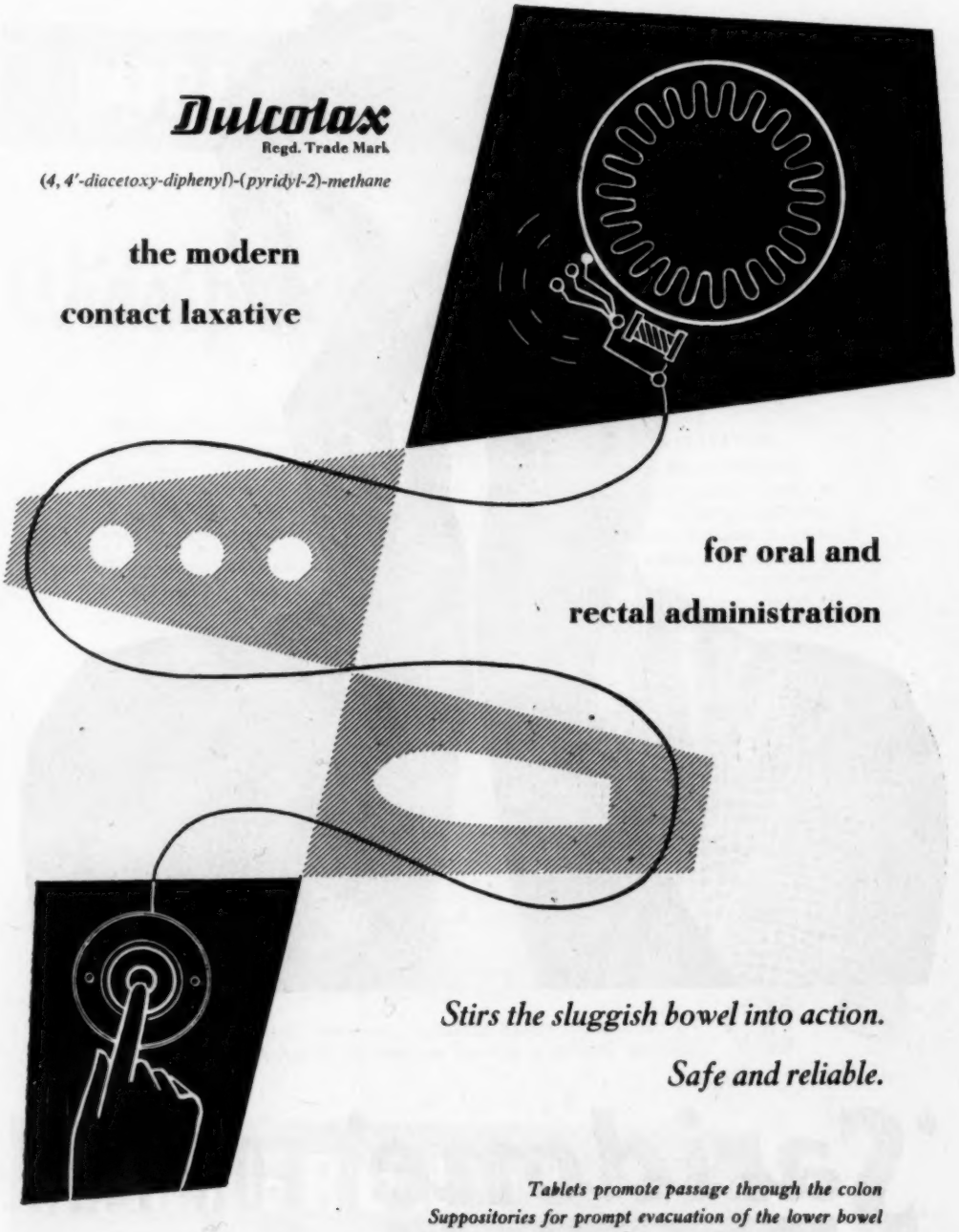

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1. LANCET, 1954, *2*, 942.
2. B.M.J., 1954, *2*, 1287.
3. B.M.J., 1954, *2*, 1255.
4. LANCET, 1954, *2*, 1245.

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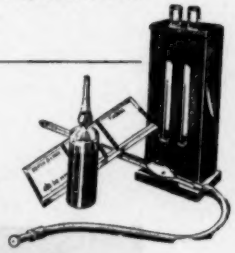

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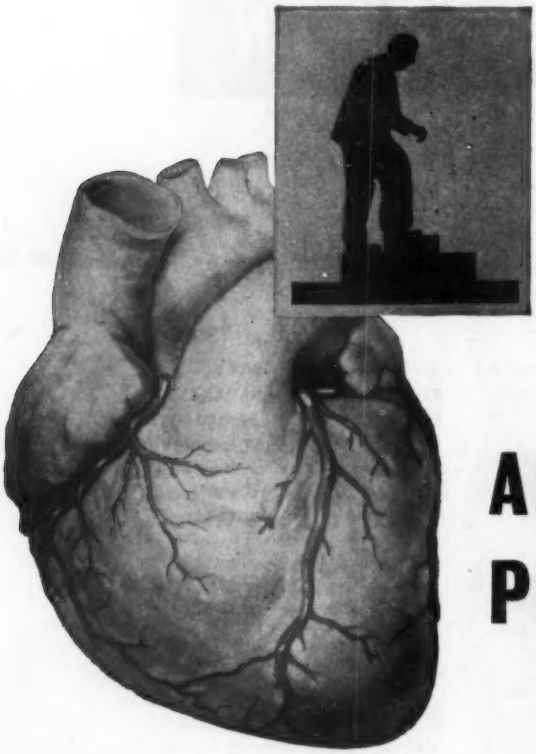

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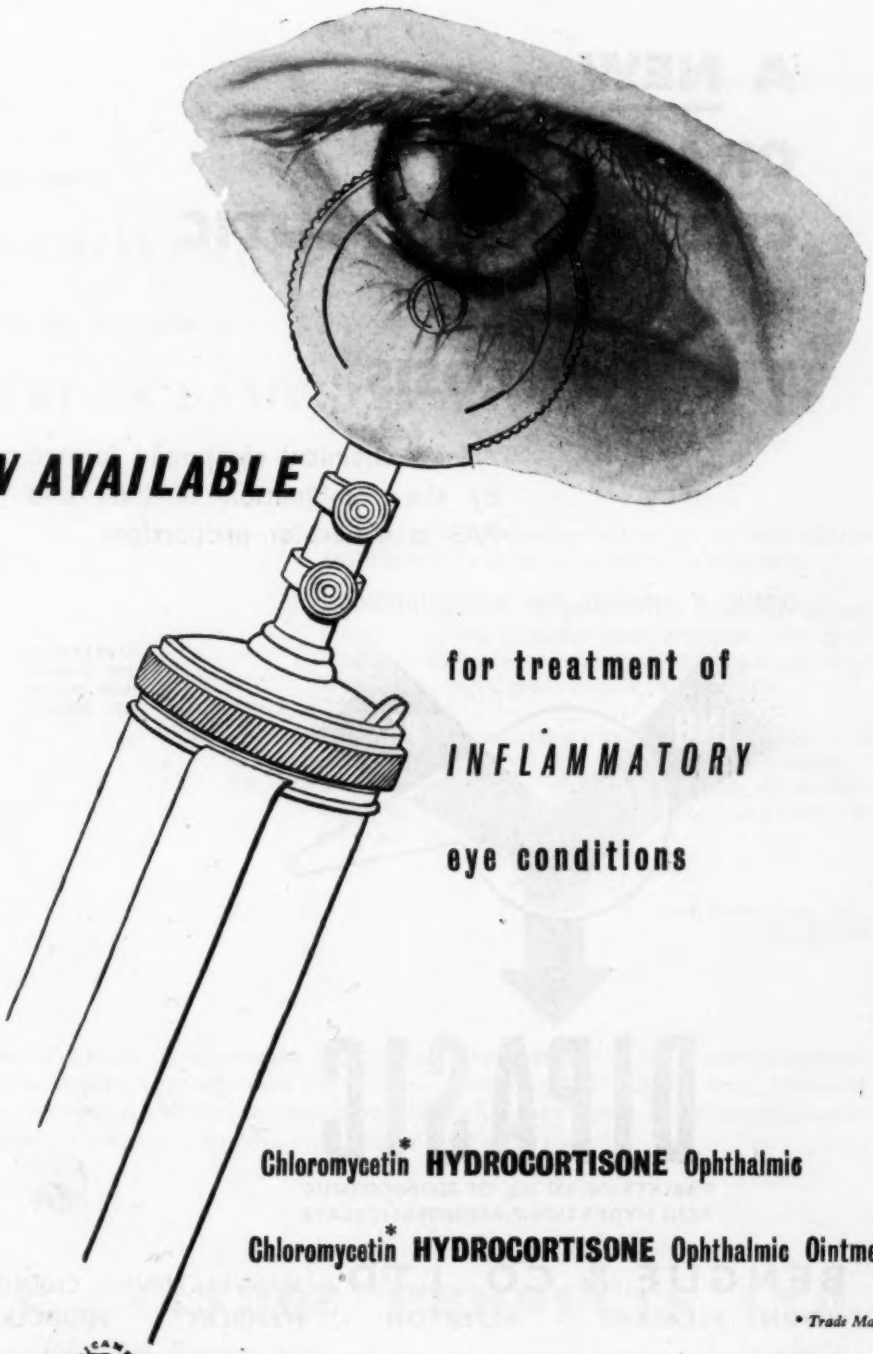

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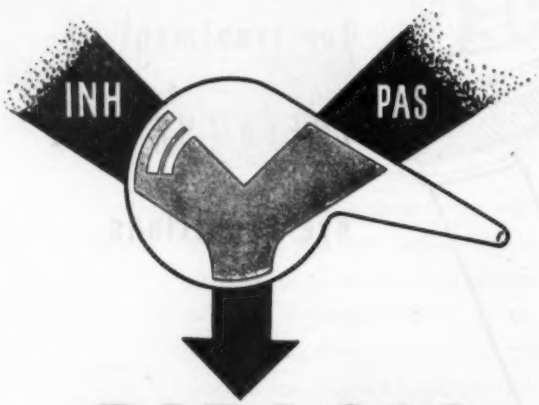

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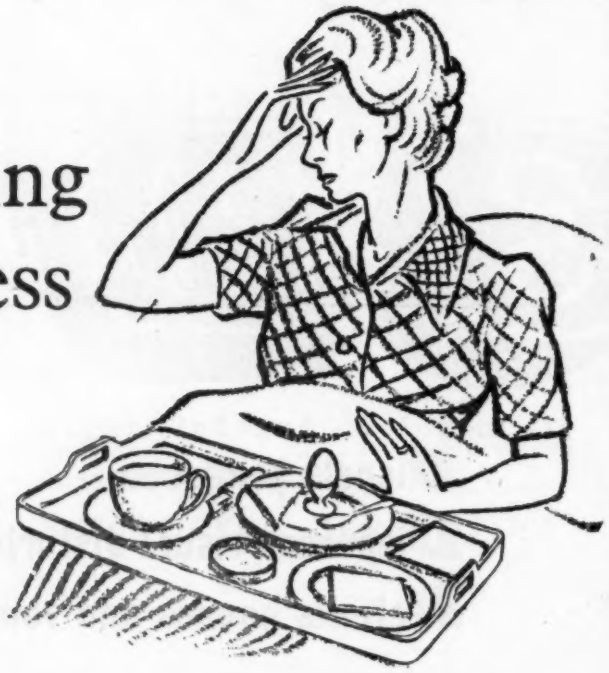

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PHYSIQUE, CHARACTER, AND DISEASE*

A CONTEMPORARY APPRAISAL

J. M. TANNER
M.B., Ph.D. Lond., D.P.M.
LECTURER, INSTITUTE OF CHILD HEALTH, UNIVERSITY OF LONDON

I HAVE been asked to give some account of what I conceive to be the present general status of knowledge and of research on the relation of physique to character and disease. Easier asked than answered! To walk back past all the familiar trees to the point from which he can see the whole battlefield in perspective is never easy for the research-worker engaged in the fighting; it is never easy, and it is sometimes disturbing. The advances made by his friends, and especially by himself, dwindle to pinpoints as the view gets longer; and unless he is careful he may lose sight of them altogether, and either quit the battle, or else sit down comfortably and shout loudly the news of imaginary victories.

The truth is that very little is known about this subject: and I think it is disgraceful that this should be so. After all, the subject is an old one. Its beginnings are traceable to the Pythagoreans, and beyond: its first codex, inevitably, was received at the hands of Galen, the latest translation of whose book (apart from an abridgment in 17th-century French) was made by Thomas Linacre, the founder of the Royal College of Physicians, in 1521. This work was the authoritative source of most non-theological speculation on the nature of man and the origin of his diseases throughout the whole of the Middle Ages and well into the Renaissance. Yet Linacre's Latin version *De Temperamentis et De Inaequali Intemperie* only ceased to be a very rare book indeed because it happened to be one of the first books ever printed in Cambridge, and so was reproduced facsimile in some quantity in 1881 to celebrate the 360th anniversary of this splendid event. From Galen onwards there were many distinguished physicians who dealt with our subject; most notably, perhaps, Cabanis (1824) at about the time of the French Revolution. Then towards the end of the last century the scientific investigation of physique and its relationships began, particularly in the studies of constitutional diseases made by Beneke (1878, 1881), a pathologist of Marburg. But the year in which Beneke died was the year in which Koch announced the discovery of the tubercle bacillus. The idea of disease (and even character) as something imposed from outside rather than generated from inside has always been more popular than its converse in our culture; so work on human constitutional differences has proceeded slowly, and in an atmosphere of neglect not untinged with disapproval. After Beneke, however, the subject was revived by the great Italian physician Viola (1932, 1937), by the more impressionistic Kretschmer (1948) in Germany, and by Sheldon and his associates in the United States (1940, 1942, 1949, 1954).

Physique and Temperament

It was the force of Kretschmer's youthful pen, and Sprott's English translation of him, that, as you all know, brought back into prominence the alleged relationship between physique and character. But Kretschmer, despite his nineteen editions, has remained impressionistic. He divided people into discrete types (after the manner of the French school of Sigaud [1914] before him) and never reached the certainly more correct notion of continuous variations in components of build, as did Sheldon. He never provided adequate published criteria for typing people, and never statistics on the relation of character to physique in normal persons—only on the differential incidence of manic-depressive disorder and schizophrenia in patients of different build.

Sheldon went much further: his classifications both of physique and of temperament are couched in perfectly clear terms and his observations can be repeated by other investigators. His system of physical classification (to which alone amongst such classifications the word "somatotyping," which he coined, should be applied) in my opinion renders Kretschmer's obsolete, since it has all the latter's advantages and only some of its disadvantages (see Tanner 1953). Somatotyping is not difficult to learn and is reasonably objective; properly trained human biologists can and should reach agreement to within $^1/_2$ a rating on a 7-point scale 90% of the time when somatotyping by inspection of photographs and use of height and weight and weight-history only (Tanner 1954a). Sheldon's system for classifying temperament is simple enough too, though subjective: it consists in taking a long and detailed life history and then rating a series of behaviour traits assumed to stay relatively constant in any individual throughout his life, or anyway throughout considerable stretches of it. Sheldon found very clear-cut relations between his three components of physique and his three components of temperament in a study of two hundred students, and made the perfectly reasonable claim that this was because his method had picked out the right variables at each level for correlation.

About this claim there are two things to be said: first, that nobody has repeated Sheldon's work exactly, or even fairly closely, as he did it, and so we are in no position to pass final judgment on his full claims; second, that such studies as have since been made tend to support his thesis only mildly and generally, and lead, admittedly by inference only, to a lower degree of association than one would expect from his work (Tanner 1951). Most of these studies, however, are of the association between physique and type of career chosen (see Tanner 1954b), and though career certainly reflects temperament it does so only faintly. Very recently Dr. T. Hunter and I have tried to repeat Sheldon's work more closely by somatotyping a group of boys aged 17 at an English boarding-school, and prevailing on the housemasters of fifty of them to rate their boys on Sheldon's shortened scale of temperament. Our analysis of these data is unfinished, but it is clear that we shall find only low correlations; and certainly not ones comparable to Sheldon's. On the other hand, the six housemasters involved had little knowledge of the intricacies of psychological rating devices. Also they knew the boys' histories only over the past three years, and had observed them only in a somewhat restricted and artificial environment. But they did have the scientific advantage of knowing practically nothing about the hypothesis being tested.

Still, allowing for all this, we cannot say that there is very much confirmed scientific evidence (should I add "yet"?) in favour of a close relationship between physique and character. This admission places me in a quandary, because I think that the evidence of everyday life is strongly in favour of the existence of a relationship, and of one very much of the sort described by Kretschmer and by Sheldon. I would go even further and say that I *think* that I see neurotic behaviour quite often coming from an attempt to behave in a fashion out of character with what one might predict from the physique. I think I see more often than by chance neurotic traits diminishing as the person concerned comes to act more in accordance with theoretical expectation.

Now does this simply mean that I am at heart just another optimistic, naïve, and uncritical amateur?

* Abstracted from an address delivered to the Second European Congress of Psychosomatic Research, Amsterdam, April, 1956.

I do not think so; at least I hope not, because I shall return in a moment to discuss quite bluntly the harm done to our field of research by just these, often very well-intentioned, people.

But can you seriously imagine Laurel and Hardy with shapes the same and behaviour transposed? Can you imagine Falstaff and Mephistopheles, Scrooge and Pickwick, each in the other's physical shoes? Have you ever seen a portrayal of Christ that looks like Buddha? Evidently we have in our culture a stereotyped image linking physique and behaviour in our minds. This stereotype is no novel creation or flash-in-the-pan; it has deep roots in the culture; it has not changed much since the Middle Ages or probably before. Is it then simply a collective cultural fantasy with no roots in biological fact? Are the stereotype images like the image of the ghost in Bali—the figure with the long pendulous breasts, the great masculine muscles, the dense covering of coarse body hair—a purely imaginary compendium of all that the Balinese find odious? I do not think so; and I think that ultimately the cultural stereotype will be shown to have a firm grounding in biological events. But I agree the matter is obscure, and I would plead for much more work and many more properly trained workers dealing with this problem.

Physique and Disease

The whole subject of constitution is for many reasons a peculiarly difficult one, and the sector dealing with relations of physique to character and to disease is perhaps the most difficult part of it. I cannot emphasise too strongly the harm done by an unscientific approach in this field. Let us be quite clear about it: until recently the whole field had a poor reputation amongst medical scientists; and I think a good deal, though not all, of this reputation was deserved. The amount of nonsense talked in the past and still being talked on occasion is appalling. We should be thoroughly ashamed of it, and refuse to add to it in any way or under any pretext. There is, for example, the system of "endocrinological" biotypes (Pende 1955) generated, ironically enough, in the country of Giacinto Viola, perhaps the greatest constitutionalist of this century: a system based on vague supposition instead of established physiology, and proceeding by affirmation rather than test. There may well be relations between habitual endocrine activity and physique; I have myself been investigating the possibility scientifically for the past four years, but in this time I have discovered very little—perhaps because I use rigorous chemical method and modern statistical design.

Not that there is not something to be discovered: certainly there are relations between physique and disease, and it is very likely that some of these are mediated by endocrinological factors. Lister and I (1955), for example, have shown (and not for the first time—see Draper et al. 1944) that the late-incidence type of diabetic is different in build from the early-incidence type, and in all probability is different from the general population. These patients are more endomorphic, in Sheldon's terms, more brachytypical in Viola's. The criticism can be brought against our results that this build may be caused by the disease, rather than predispose to it; and such criticism appears to be particularly cogent in this instance, since a prominent feature of endomorphy is the tendency to put on fat. All the same I do not think it is well founded (any more so than the notion that the large size of babies born to diabetic mothers was because of the maternal high blood-sugar level—a notion refuted when it was later shown that equally large babies were born to pre-diabetic mothers). However, since we were not able to study the physique of our patients before the disease developed, we cannot refute this argument so far as our diabetics are concerned. But Berry and Nash (1955) have recently made a study of physique and tuberculosis which is entirely immune from this criticism. They used the files of the mass miniature radiography service to obtain an index of the build of a man months or years before any sign of the disease developed; and they found differences in physique between those who later developed tuberculosis and those who, though paired for various social and personal circumstances, did not. This study, though necessarily confined to the thorax, showed convincingly that men in whom tuberculosis later developed were more linear in build and relatively leaner than those who remained well. These very valuable observations are now being extended to cover a wider range of conditions, including coronary-artery disease, and here there is already strong evidence of an increased incidence in more mesomorphic men (Gertler et al. 1951, Spain et al. 1955). There is also the old evidence of the Italian school that cancer in general spares microsplanchnics and those high in ectomorphy (Benedetti 1931); and also a considerable body of data showing that the different types of psychosis (see Tanner 1951), and in some cases of neurosis too (Rees 1945), are related to physical build.

This is a potentially rich field of research; but only if the research is allied to genetical and physiological exploration. To discover that there is an excess of mesomorphs who have coronary atherosclerosis is merely to put oneself in the position to ask the really interesting question: what is it in the physiology or sociology of the mesomorph in particular which predisposes him to coronary-artery disease? With our elderly diabetics we think of the relationship thus: people carrying a particular gene or set of genes are predisposed to developing diabetes in middle age, but only some of them actually develop it. In other words the gene can only express itself given a certain physiological milieu to work in. This milieu is itself partly a product of the gene complex and partly a reflection of environmental factors. The component of physique endomorphy is a prominent feature of this milieu and affects the expression of the diabetic gene(s) probably partly by a direct physiological mechanism we know nothing about, and partly by predisposing the individual to putting on excess fat, which in turn allows the gene to produce its effect. In short, and generalising, I conceive the common relationship between physique and disease to be this: physique acts as a manifestation of the gene complex affecting the penetrance or expressivity of more specific genes predisposing to particular disorders. This is only one form the relationship may take, of course; in the case of infectious diseases physique may act by affecting the degree of resistance, and in other cases the link may be through temperamental relations and behaviour, a person of a particular physique placing himself more at hazard to a particular disease by virtue of occupation or personal habits.

But to return to our diabetics: what *is* the physiological milieu that characterises endomorphy particularly and sets apart those high in endomorphy from, say, those high in mesomorphy? We really have not the remotest idea. Endocrine differences presumably; metabolic ones certainly. Structural ones in the brain? Personally I incline to think so.

You see that I assume for the most part a genetical background for physique and for individual physiological differences underlying the predisposition to disease. This approach opens up what I believe would be a fruitful flank attack on the old problems of physique and disease and also physique and behaviour. I think we should endeavour to disentangle the genetical elements involved in constitutional physiological differences, by studies of twins in the human and particularly by studies of inbred

strains in laboratory animals. Surprisingly enough the professional physiologists have so far ignored both fields completely. Burt and Sawin and I (Tanner and Sawin 1953, Tanner and Burt 1954) have shown, however, that at least some of the components of physique which differentiate one man from another are present also in other animals—as indeed is perfectly obvious to farmers, race-horse owners, and dog breeders. Thus strains of linear and strains of non-linear rabbits can be bred, and the physiological differences between the two investigated. Furthermore, strains of animals differing in temperamental characteristics can also be obtained by inbreeding, as Keeler (1947) and others (see Hall 1941) have shown. Pavlov laid great emphasis on temperamental differences in his dogs as affecting the formation of conditioned responses; but I doubt if it was altogether because he used a medieval and anthropomorphic system for classifying them that this aspect of his work has been ignored ever since.

Relationships between physique and temperament in man, supposing they exist at all, could come about in various ways. One theory ascribes them to the action of genetic causes, either through pleiotropism or linkage; the other to early conditioning. The first maintains that genes concerned in body shape also have effects on the brain and endocrine structure, and that these dictate temperament; or, alternatively, that there exist separate but closely linked genes for each. The other view is, for example, that the highly mesomorphic child, on mixing with other children, finds by chance that he can knock down the others and continues thereafter to do so because of his success and because it comes to be expected of him. These two theories are not, of course, mutually exclusive: conditioning could well support and reinforce an originally genetical tendency.

The Future

Thus, to sum up the matter, I see this field as one with a long but somewhat chequered past; a future full of promise, fascination, hard work, and scientific difficulty; and a present neatly suspended between the two. I do not think the future holds anything of importance unless we comport ourselves strictly as scientists, and let me add quite bluntly that to investigate this treacherous ground without a very sound knowledge at least of modern statistical method and genetical theory—or without very close colleagues with such knowledge—is an impertinence to the unknown that invites disaster. The theme is a difficult one and admits of no facile improvisation; that is our challenge and we must meet it squarely.

Research into constitutional differences in physique and in behaviour and in disease is, I believe, important. Since Koch's time the bacteriologists and the chemotherapists have made great strides; so great that we are increasingly left with the diseases that lie outside their province. Medicine is becoming more and more constitutional, if I may use that word in its widest sense; our problems are increasingly those of dealing with individual susceptibility to inevitable physical and mental stress, of finding out why one person ultimately succumbs to a chronic and unspectacular disease while another does not, of assuring the conditions of healthy growth and healthy old age individually suited to the differing members of our community. Beneke (1881) foresaw accurately the medical implications of his subject when he wrote:

> "The different constitutions and the different resistances conditioned by them form only the soil in which certain diseases develop when the individual is subjected to certain stresses. The importance of this point of view for general hygiene and therapy goes without saying. It is in our power to lead the different constitutions happily through the dangers of life if we recognise them correctly and if we understand rightly their physiological differences."

Unfortunately, we are still very far from recognising them or understanding their differences: but the current of medicine is moving that way, and we must meet the demand for research in this field with all the scientific discipline and responsibility that the bacteriologists and the biochemists brought to the elucidation of their sectors of medicine.

Finally, research into constitutional differences in physique and behaviour has a still wider interest: it has a bearing, I believe, on our biological view of man and our conduct of personal relationships. At the roots of our friendships and enmities lie largely unconscious factors, and I think it likely that one of these factors is our partly instinctive response to the physique and the gestures of the other person: I suspect that the mechanism may be very similar to the innate releasing mechanisms described so beautifully by Lorenz and Tinbergen and the ethologists (see Lorenz 1956). Admittedly the culture in which we grow up plays a large part in moulding both our gestures and our responses to them; yet amongst people who share the same cultural background, and to a lesser extent amongst those who do not, I think a proportion of the individual differences in gesture and reaction is innate in origin. Our bodies and the way we handle them constitute inevitable sign-stimuli—somewhere I think Sheldon has written of the instinctive deference given by both men and women in our culture to the extreme mesomorph, however little he may "deserve" it. We have little insight, as a rule, into our reactions to these sign-stimuli. I think that in a single culture misunderstanding frequently arises from a person of one constitution mis-evaluating the stimuli provided by a person of another constitution, just as in different cultures mis-evaluation may arise when a person carries his gestures from one culture to another. Physical and temperamental gulfs are difficult to cross, and readily productive of misunderstanding; and it is my hope that the insight into people different from oneself which the study of constitution gives may contribute towards a better understanding of one person by another.

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INJURY TO RECURRENT LARYNGEAL NERVES DURING THYROIDECTOMY

A COMPARISON BETWEEN THE RESULTS OF IDENTIFICATION AND NON-IDENTIFICATION IN 1022 NERVES EXPOSED TO RISK

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INDIRECT laryngoscopy should be done before and after every thyroidectomy.

Preoperative Examination

Preoperative laryngoscopy occasionally reveals unsuspected paralysis of a vocal cord. Such a discovery may influence the surgeon's decision to operate and exonerate him if the symptoms develop postoperatively. The examination is of particular importance in patients who have had a previous operation on the thyroid gland, or if thyroid carcinoma, chronic thyroiditis, or myxœdema is suspected. A paralysed cord was found preoperatively in 6 of 672 patients thus examined. The thyroid conditions were fibrosarcoma (1 case), carcinoma (2 cases), Riedel's thyroiditis (1 case), recurrent toxic goitre (1 case), and recurrent non-toxic goitre (1 case). In addition 5 unilateral palsies were found in 60 other patients (recurrent non-toxic nodular goitre 2 cases, and recurrent toxic goitre 3 cases).

Clinical test for bilateral abductor palsy.—Narrowing of the glottis, although the speaking voice may be normal, may be revealed clinically by getting the patient to take a deep inspiration when breathless. The patient should be asked to count as high as she can (say from 1 to 24) without taking a breath and to finish by taking a deep breath. A crowing type of inspiratory stridor is produced if the glottis is much narrowed, as in bilateral partial recurrent-nerve palsy. I have known such a lesion to be demonstrated by the counting test when it had been overlooked on indirect laryngoscopy.

Postoperative Laryngoscopy

Postoperative laryngoscopy is essential for a true estimate of the frequency of vocal-cord damage due to thyroidectomy. Vocal-cord paralysis following thyroidectomy is commoner than is supposed. Existing statistics tend to be based on the selective postoperative examination of patients who have some obvious symptom of damage to a recurrent laryngeal nerve—e.g., a hoarse voice. But this does not reveal those cases where compensatory readjustment of the unparalysed cord has produced a normal speaking voice at conversational distance. Such cases are plentiful and may be wrongly assumed not to have suffered any damage to a recurrent laryngeal nerve. Moreover an injury-rate calculated on only a proportion of the patients operated on can be applied to that proportion only.

Laryngoscopy immediately after thyroidectomy, while the patient is still anæsthetised, can also be misleading. If the vocal cords are seen to abduct and adduct normally it can be assumed that there has been no injury to the recurrent laryngeal nerves; but, if movement is impaired, it should not be taken as proof that a nerve has been injured, because in some cases pressure on the vocal cords by an intratracheal tube may temporarily limit adduction or abduction and in other cases the depth of anæsthesia may prevent normal movement of the cords.

Postoperative laryngoscopy should not be done too soon after the operation or it will be uncomfortable for the patient; furthermore the findings cannot be accurately assessed at this early stage. Our practice is to do postoperative laryngoscopy on the day before the patient is due to be discharged. The throat is sprayed with 4% lignocaine (this has not produced any unfavourable reactions in our experience), and after three minutes the larynx is ready for examination. After the examination the patient is instructed not to eat anything for the next two hours—i.e., until laryngeal sensation has returned.

Exposure of Nerves

Some surgeons do a blind operation; they take the view that the deliberate exposure of the recurrent laryngeal nerves by dissection is likely to produce more palsies from handling than if they are left undisturbed and unidentified.

Other surgeons believe with equal conviction that the recurrent laryngeal nerves should be identified. They argue that circumstances have changed and that modern anæsthesia and the anti-thyroid drugs have removed the urgency for speed in operating on the thyroid gland and so allow the operator time for an unhurried search for the recurrent laryngeal nerves in a field which should be bloodless.

A third course is for the surgeon to improve his knowledge of the local anatomy by exposing the recurrent laryngeal nerves on a limited number of occasions and thereafter to revert to the blind operation with the added safety which his experience will have given him.

Sites of Injury

The anatomy of the recurrent laryngeal nerves, with special reference to their relation with the inferior thyroid arteries, has been extensively reviewed by Fowler and Hanson (1929), Reed (1943), Bowden (1955), and Wade (1955). Wade discussed 100 patients submitted to subtotal thyroidectomy in which the recurrent laryngeal nerves were dissected out on both sides and had their anatomy and vulnerability studied. He found that the recurrent laryngeal nerve lay deep to the inferior thyroid artery and all its branches in 46·5% of cases, superficial to the artery in 10·5%, and between the two main divisions of the artery or between its glandular branches in 34·5%; in a small percentage the inferior thyroid artery was absent. On rare occasions, probably in about 1% of cases, the recurrent nerve on the right side does not recur, but passes downwards and medially behind the common carotid artery to enter directly into the larynx.

It seems to be generally agreed that by far the commonest factor predisposing to injury is arterial fixation of the nerve to the thyroid gland in those cases in which the nerve intermingles with the terminal branches of the artery. These vessels exert a fork-like grip on the nerve, tethering it to the gland as the lateral lobe is displaced forwards during its mobilisation. When the nerve lies either superficial or deep to the main arterial trunk there is not the same tendency for the nerve to be lifted forwards during the manipulation.

My own experience agrees with that of Wade in placing the sites of greatest vulnerability to the nerve as follows:

(1) On the lateral surface of the thyroid gland the nerve may be injured by marker forceps placed there before its resection, or by hæmostatic stitches used in suturing the gland after its resection, or simply by excessive traction or rough handling.

(2) At the lower pole of the thyroid gland the nerve may be included in the ligature of the inferior thyroid veins. I think that this accident can happen very readily, particularly if a mass ligature is used for securing the veins.

(3) At the upper pole of the thyroid gland, just before the nerve enters the larynx, if small bleeding branches of the artery are picked up close to the trachea, the nerve may be lying among them. Injury at this site is most surely avoided by a clean exposure of the superior thyroid vessels, which should be tied and divided as a pedicle and not by the clip-and-cut method through the glandular tissue of the superior pole.

Hæmorrhage is the agent which prepares the conditions most favourable to injury at all sites.

TABLE I—RATE OF INJURY OF RECURRENT LARYNGEAL NERVES DURING THYROIDECTOMY

Reference	No. of operations	Amount of thyroid gland removed	Postop. laryngoscopy	Nerves identified or unidentified	Palsies	Injury-rate per 100 ops.	No. of nerves exposed to risk	Injury-rate related to nerves exposed to risk
Riddell (1956)	672	Subtotal thyroidectomy 350 Hemithyroidectomy 322	All cases	Iden. 511 Unid. 511	11 18 } 29	4·3 %	1022	Iden. 2·1 % Unid. 3·5 % } 2·8 %
Gisselsson (1949)	475	Subtotal thyroidectomy 405 Hemithyroidectomy 70	,,	Unid.	35	7·4 %	800	3·9 %
Till (1955)	300	Subtotal thyroidectomy 239 Hemithyroidectomy 61	,,	Unid.	30	10 %	539	5·6 %
Wade (1955)	84	Subtotal thyroidectomy 84	,,	Unid.	Nil	Nil	168	Nil

The table illustrates the two methods of computing the injury-rate.
Iden., identified. Unid., unidentified (not deliberately identified).

Identification of Recurrent Laryngeal Nerve

Visual identification.—In this paper "identification" means visual identification unless identification by palpation is specifically mentioned. There are degrees of visual exposure of a structure. The identification of the recurrent laryngeal nerve does not require its naked exposure as in an anatomical display specimen. It is wrong and unnecessary to dissect out or to strip the recurrent laryngeal nerve of its ensheathing fascia. By opening up the tissues lying to its outer side the nerve can be clearly demonstrated and identified without ever touching it with an instrument. The nerve is first sought for, and is most readily found, where it comes into relation with the inferior thyroid artery. In other words, it should not be looked for in the lower part of the wound—the root of the neck—where it bears away from the side of the trachea and œsophagus, or in the upper part of its course, where it is covered and partly obscured by strong fascia. It is recognised also by the minute vein which runs upon its surface. The operation must be done gently, because the nerve is readily damaged by stretching if too much traction is exerted on the thyroid gland, a mistake which is particularly likely to be made when the thyroid lobe is unusually mobile.

Identification by palpation.—The visual method of exposure is not always wise or expedient. In such cases, with experience, the nerve can be identified in a high proportion of patients by palpation. It feels like a cord or a thrombosed vein which can be gently rolled against the trachea. Identification by touch cannot however for comparative statistical purposes be accepted as being as accurate a method of identification as the visual.

Frequency of Injury

Method of Computing Injury-rate

The injury-rate is usually expressed by relating the number of nerves injured to the number of operations. Thus, if 100 operations have been done and four nerve lesions are found on postoperative laryngoscopy, the injury-rate would be declared to be 4%. This method has the disadvantage that it does not relate the number of nerves injured to the number of nerves exposed to risk. To take an extreme example, a surgeon using this method and reporting a 4% injury-rate on 100 subtotal thyroidectomies (with 200 recurrent nerves exposed to risk) will be compared to his disadvantage with a surgeon reporting 100 hemithyroidectomies (100 nerves exposed to risk) and a similar injury-rate. Most published injury-rates have been computed from a mixed group of operations, some unilateral and some bilateral, but even this method does not allow strict comparison between injury-rates from different sources and individuals. I therefore suggest that the injury-rate can more accurately be computed by relating the number of nerves injured to the number of nerves exposed to risk. The results in my series, expressed in this way and based on preoperative and postoperative laryngoscopy by an independent observer in every case, are set out in table I with comparable results reported by Gisselsson (1949), Till (1955), and Wade (1955).

TABLE II—INJURY-RATE IN HEMITHYROIDECTOMIES

—	No. of nerves	No. of palsies
Identified	148	5 (3·3 %)
Unidentified	174	10 (5·7 %)
Total ..	322	15

My material consisted of 350 bilateral (subtotal) thyroidectomies and 322 unilateral thyroidectomies (hemithyroidectomies); hence 1022 nerves were exposed to the risk of injury. Table I shows that 511 of these nerves were visually identified, of which 11 were injured (2·1%), and 511 nerves were unidentified, of which 18 were injured (3·5%). But if the number of nerves injured (29) is related to the number of operations (672), the injury-rate becomes 4·3%.

If the hemithyroidectomies are separately examined to determine if there is any difference in injury-rate between those in which the nerve was identified and those in which it was not identified, it will be seen that the same kind of relationship persists as in the combined group (table II).

Wade (1955) did 100 subtotal thyroidectomies with deliberate identification of the recurrent nerve, and postoperative laryngoscopy was done on 84 of these patients without revealing any nerve lesions.

Till (1955) has had the courage to publish figures which do not appear to reflect to his advantage, but in my view they approximate much more nearly to the true injury-rate revealed by postoperative laryngoscopy—as do mine and those of Gisselsson (1949)—than to the previously accepted rate.

Numerous series have been reported in which selective postoperative laryngoscopy has been done, but (for the reasons set out above) this method, not being comprehensive, cannot give a reliable measure of the over-all injury-rate.

Although in my series the injury-rate for identified nerves (11 of 511) seems to lend support to the view that the recurrent laryngeal nerves should be identified, a statistician would say (and has said) that the rate is not significantly less than for nerves not identified (18 of 511). The injury-rates by the two methods are also brought closer by the fact that most of the 511 unidentified nerves fell in my earlier cases; hence the lower injury-rate in identified cases may be a reflection, at least in part, of my greater experience of the operation rather than the result of identification. Of the 29 nerves injured, the right recurrent laryngeal nerve was injured on 17 occasions, and the left on 12. The difference is not significant, but I have always found the right nerve more difficult to locate than the left, and for this reason it is probably more vulnerable.

"Transient" Paralysis

The word "transient"—to imply temporary palsy of a recurrent nerve—should be used sparingly and only if full recovery of movement of the vocal cord has been

confirmed objectively by laryngoscopy as well as subjectively by a return of the voice to normal tones. Fortunately the palsy is more often transient than permanent.

In Gisselsson's (1949) series of 880 nerves exposed to risk 35 cases of paralysis were found on early postoperative laryngoscopy, but on re-examination at intervals of up to six years only 12 of these were found to be permanent—i.e., about two-thirds recovered.

In Till's (1955) series the findings were similar: of 539 nerves at risk there were 30 early palsies, but 21 of these recovered, leaving only 9 cases of permanent paralysis (1·7%).

In my series, of 29 patients developing paralysis of a vocal cord 22 were examined at intervals of 1–10 years after operation and 12 of these were found to have recovered: 19 cases of complete paralysis of the vocal cord with 10 recoveries, and 3 cases of unilateral partial paralysis (abductor paralysis) with 2 recoveries. It is interesting and comforting to know that some cases of complete paralysis, with a cord fixed in the cadaveric position, can with the passage of time recover full movements.

The differentiation between complete and partial paralysis in the early postoperative examination is not always easy, and it is possible for some slight movement of the cord to be undetected. This could explain the preponderance of (apparent) complete palsies in this series.

If the paralysis of a recurrent laryngeal nerve persists, the vocal cord remains immobile on phonation and appears thin and withered.

Vulnerability of Abductor Fibres

In the case of minor trauma the abductor fibres are more likely to fail than the adductor (Semon 1881, Negus 1949). The view that the abductor fibres occupy a circumferential superficial position in the recurrent laryngeal nerve, as postulated by MacKenzie (1880), or that the abductor fibres are separately grouped on the inner side of the nerve, as is the case in the dog (Russell 1892), has been disproved in man by Sunderland and Swaney (1952). These workers have illuminated this subject by their meticulous investigations of the intraneural topography of the recurrent laryngeal nerve in man and of the manner of its terminal branching.

It had been suggested (King and Gregg 1948) that, when the nerve divides extralaryngeally, one terminal division carries only abductor fibres, and the other only adductor fibres. If this were so, it might explain how the abductor fibres could be selectively injured; but it would still be difficult to explain, even if the abductor fibres were commonly concentrated into one extralaryngeal terminal branch, why the abductor branch should be the one more liable to injury. Sunderland and Swaney (1952) found that the nerve divided into its two terminal divisions before reaching the inferior constrictor in 70% of their dissections, but they did not find that the extralaryngeal division represented a separation of the nerve-fibres into two systems, one innervating the abductor muscles and the other the adductors—except rarely. More usually they found a wide variation in the pattern of the two main terminal branches, with each branch carrying both abductor and adductor fibres.

Study of the internal structure of the main trunk of the recurrent laryngeal nerve showed that the nerve bundles were not arranged as segregated parallel strands but formed repeated plexuses leading to such an intermingling and frequent redistribution of the fibres that no constant anatomical arrangement of fibres within the main trunk could be maintained or become separated to subserve the function of any particular group of muscles.

There therefore seems to be no purely anatomical basis on which a satisfactory explanation of the preferential paralysis of the abductors can be based. It only remains to postulate that the abductor elements have a lower resistance to injury, or that an unknown factor operates peripherally within the muscles. The evolutionary theory of Negus (1949) seems the most rational. He points out that the larynx is guarded by two groups of muscles: a primitive protective sphincteric group (the adductors); and a dilator group (the abductors) essentially associated with the much more recently developed vocal function of the larynx. He believes that it is reasonable to expect that the vital protective function of the sphincteric group should give this group a greater vitality and the ability to survive over the more recently evolved dilator group.

Conclusions

On balance I feel that the surgeon operating on the thyroid gland today should arm and protect himself with more than a dissecting-room knowledge of the course and behaviour of the recurrent laryngeal nerve. Precision in technique indeed can be carried too far, and we must beware of this; but few advances in technical procedures have come without knowledge of where important adjacent anatomical structures lie. We can only acquire this knowledge by identifying the nerve visually on a reasonable number of occasions. Most surgeons will find that they will need to expose it about 25 times before they get to know where to look or feel for it. It takes a good deal of self-discipline to force oneself to search for the nerve in thyroidectomy after thyroidectomy instead of getting on with the operation; but I am certain that the anatomical knowledge gained so tediously and almost painfully will stand the surgeon in good stead thereafter, and that those who have so prepared themselves will, over the years, injure fewer nerves than those who have not. The exercise also teaches the surgeon how best and most safely to mobilise the lateral lobes of the thyroid gland and the inferior thyroid veins, which may be in such intimate relationship with the recurrent laryngeal nerves.

Although I am convinced of the need to expose the recurrent laryngeal nerve in a series of cases as an essential preliminary and part of the anatomical training for thyroidectomy, I am less certain of the wisdom or necessity for continuing visual identification once this early experience has been obtained. After the necessary anatomical experience has been gained it should be reasonable and safe to revert to the blind operation. Naturally in exceptional cases, such as total thyroidectomy, and particularly when operating on a very nodular goitre, it will be prudent to identify the nerve visually, and at all times identification by palpation is a habit that is worth cultivating.

Unfortunately the protagonists of non-identification have not published results supported by laryngoscopy in sufficient numbers for conclusions to be drawn or comparisons made. More factual information is needed. It is to be hoped that injury-rates following thyroidectomy by "identifiers" and "non-identifiers," and perhaps by followers of the compromise plan suggested above, duly based on laryngoscopy will be forthcoming in the near future.

In spite, however, of all the diligence and care we may practise there will probably remain a small residuum of unavoidable recurrent-nerve palsies following operations on the thyroid gland (Bowden 1955). Meanwhile the spectre of bilateral abductor paralysis is ever present to haunt and taunt us, and such surgical tragedies are a challenge to all to strive to improve the present position in which the rate of injury to the recurrent laryngeal nerve is probably about 7%.

Summary

Preoperative and postoperative laryngoscopy are necessary to provide a true record of the rate of injury to the recurrent laryngeal nerve during thyroidectomy.

This rate is most accurately expressed by relating the number of nerves injured to the number of nerves exposed to risk.

The paralysis of a vocal cord resulting from such injury to a recurrent laryngeal nerve is not inevitably permanent: cases of complete paralysis as well as those of partial paralysis may in time fully recover.

In this series 1022 nerves were at risk. The nerve-injury rate following thyroidectomy showed a slight bias in favour of identification, but this was judged not to be statistically significant. There was certainly no evidence that identification produced a higher injury-rate than non-identification. The conclusion arrived at after reflecting upon my experience is a compromise between the extreme views of the "identifiers" and the "non-identifiers." It is that the surgeon operating on the thyroid gland should arm himself and protect his patient by visually identifying the recurrent laryngeal nerves until he is familiar with their normal course and disposition. Thereafter with this anatomical experience to fall back on it is reasonable to discontinue deliberate identification except in special cases.

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ULCERATIVE COLITIS AND PREGNANCY

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ULCERATIVE colitis in women usually comes on in their child bearing period of life. Of 398 consecutive cases of ulcerative colitis seen at the Gordon Hospital 244 (62%) were in females, and 77% of these women had acquired the disease before the menopause.

The earliest published report on ulcerative colitis in pregnancy is that of Barnes and Hayes (1931), who describe 2 cases. Later information on the interaction of ulcerative colitis and pregnancy has been scanty and is summarised by Kallett (1952) and Foster and Cohen (1953). About fifteen reports cover about 200 cases. The general conclusions are as follows:

(1) 40% of women with antecedent ulcerative colitis will become worse during pregnancy or soon after delivery.

(2) Ulcerative colitis beginning during pregnancy is usually extremely severe.

(3) The abortion-rate and the stillbirth-rate are no higher in women with ulcerative colitis than in healthy women, and pregnancy is not adversely affected by colitis.

The question of therapeutic abortion is hardly discussed at all except by Patterson and Eytinge (1952), who decided, on the basis of 2 cases in which it had been done, that this operation was unjustifiable. Felsen and Wolarsky (1948) were of the same opinion, although perhaps less emphatically; but Abramson et al. (1951) terminated pregnancy in 6 of 33 patients with ulcerative colitis and believe that this should always be done if ulcerative colitis is present during the first trimester. They also noted that, in some patients with ulcerative colitis, the diseased area of colon increased during pregnancy, even when there was no clinical evidence of exacerbation, but that this never happened in those who underwent therapeutic abortion.

Abramson et al. (1951) and Patterson and Eytinge (1952) found it helpful to subdivide their cases into "colitis active" and "colitis inactive" at the start of pregnancy. These workers found, as might be expected, that the "inactive" group were less liable to flare-up than the "active."

An interesting group is that composed of "active" cases which improve during pregnancy. Bargen et al. (1939) observed this happen in 9 of 21 pregnancies, Felsen and Wolarsky (1948) in 30 of 50, Kapel (1951) in 7 of 27, Kleckner et al. (1951) in 5 of 13, Kallett (1952) in 13 of 23, and Patterson and Eytinge (1952) in 6 of 18. In contrast, Abramson et al. (1951) found all of 17 active cases aggravated by the pregnancy.

The only analyses of the effect of successive confinements on ulcerative colitis are by Kleckner et al. (1951) in 3 patients and by Foster and Cohen (1953) in 4 patients. These workers also show that the effect of ulcerative colitis on earlier pregnancies cannot be used to forecast its effect on subsequent pregnancies.

The subject of ulcerative colitis and pregnancy has been almost entirely ignored by British workers; the only reference appears to be the review by Buzzard et al. (1938), who briefly discussed 6 pregnancies noted during a follow-up of 116 men and women with ulcerative colitis.

This scarcity of information led me to review the Gordon Hospital series because it represents a significant addition to the number of cases reported. The study which follows also provides information about the effect of successive pregnancies on ulcerative colitis in a larger number of cases than has hitherto been available. Not enough is known about the indications for terminating pregnancy in ulcerative colitis; our experience in this regard is too small for conclusions to be drawn.

Present Study

This report concerns 100 pregnancies in 64 women among the 398 men and women with ulcerative colitis who attended the Gordon Hospital in eight years ending on June 30, 1955. Table I shows the numerical relationships with the other women in the series.

Of the relevant 64 patients 38 were interviewed and 26 were sent a questionnaire. The large majority of those contacted by post supplemented their reply with an amplifying letter. The diagnosis of ulcerative colitis was established by sigmoidoscopy in all; evidence of colonic involvement was obtained by barium enema in 51. Histological proof was obtained by rectal biopsy (Lumb and Protheroe 1955) in all of the 19 cases in which it was done (including 3 patients with doubtful or negative radiographic findings). The information obtained in this way is set out in tables II–IV. The cases are subdivided into X-ray positive and other, but with few very minor exceptions both groups have behaved in a similar manner.

Discussion

Fertility of Women with Ulcerative Colitis

The paucity of relevant published reports might perhaps be due to a low incidence of pregnancy in women with colitis; but this is not so, because nearly half the women in this series who were eligible for pregnancy became pregnant in close temporal relationship with

their ulcerative colitis (table I). Indeed, a tenth of them had more than one such pregnancy (table III).

Effect of Colitis on Pregnancy

The abortion-rate in Britain has been estimated to be about 10–15% of all pregnancies (Baird 1950), and Greenhill (1955) suggests that 40% of all pregnancies in the U.S.A. abort; but it is notoriously difficult to estimate the abortion-rate accurately for reasons not relevant to the present subject. On this basis the figure of 13% in this series (table II) is clearly not excessive, and my figure of 3% for stillbirths is very close to the national average (Baird 1950). Our patients, in fact, had a normal expectation of a live baby.

Onset of Colitis during Pregnancy or Puerperium

There is general agreement that when ulcerative colitis first appears in either pregnancy or the puerperium it is apt to be extremely severe. The present series does not show the same disastrous results as do many of the other reports. The most dramatic of these is that of Abramson et al. (1951), who report 9 such cases with only 2 survivors. Nevertheless 12 of the 26 cases (46%) in this category in my series were very severe and include 2 fatal cases, although none could be described as fulminant; among the remaining 38 there were only 9 very severe cases (24%) with no deaths to date. (Those classified here as "severe" are all sufficiently so to warrant operation, but for various reasons only 9 of the 21 actually underwent surgery.)

A retrospective investigation of the present type would fail to include most of the fulminating cases arising in pregnancy; such patients would be diagnosed and treated in a hospital with an obstetric unit. In this respect, therefore, the present series carries a bias towards mild ulcerative colitis, and this partly explains our more fortunate experience in this regard.

TABLE I—NUMBER OF PAROUS WOMEN IN A GROUP OF WOMEN WITH ULCERATIVE COLITIS

—	No. of patients
Pregnancy started during course of colitis or immediately before	64
All pregnancies completed more than a year before onset of colitis	36
Untraced married women who had colitis in childbearing period of life	11
Nulliparous married women who had colitis in childbearing period of life	20
Total	131
Total no. of females in the series	244

TABLE II—EFFECT OF 100 PREGNANCIES ON 64 WOMEN WITH ULCERATIVE COLITIS

—	X-ray positive	X-ray negative, doubtful, or not done	Total
Onset during pregnancy	9	2	11
Onset during puerperium	12	3	15
Active disease when pregnancy began:			
Deteriorated	9	4	13
Improved	17	8	25
No change	9	6	15
Improved after 1st trimester	7	..	7
Inactive disease when pregnancy began:			
Deteriorated	2	..	2
No change	16	3	19
Improved in puerperium	7	..	7
Relapsed in puerperium	7	..	7
Miscarriages	8	5	13
Stillbirths	2	1	3
Therapeutic abortions	3	1	4
Total live births	65	15	80
Total pregnancies	78	22	100

TABLE III—EFFECTS OF SUCCESSIVE PREGNANCIES ON ULCERATIVE COLITIS

—	X-ray positive	X-ray negative, equivocal, or not done	Total
No. of patients with more than one pregnancy during course of colitis	19	6	25
Consistently improved in every pregnancy or unaffected	9	5	14
Consistently deteriorated in every pregnancy	3	0	3
Inconsistent	7	1	8

Pregnancy during Colitis

If conception takes place when colitis is inactive, there is little likelihood of any exacerbation. Under these conditions a relapse took place in only 2 of 21 cases (table II); this small proportion might indeed have taken place by chance in the course of a disease normally subject to relapses. When, however, ulcerative colitis was active at the beginning of pregnancy, a quarter of the women suffered a relapse, and a further 45% went into remission during pregnancy; some of the latter did not show improvement until the end of the first three months (one of these again relapsed slightly later in the pregnancy) (table II).

Puerperium in Established Colitis

During 44 pregnancies the patients had no colitis symptoms or were greatly improved during pregnancy. 7 of these relapsed in the puerperium, but this is partly offset by the fact that of 41 with symptoms during gestation 7 had remission in the puerperium (table II).

TABLE IV—RELATIONSHIP BETWEEN PREGNANCY AND COLITIS IN MULTIPARÆ WHERE LAST PREGNANCY ONLY WAS ASSOCIATED WITH COLITIS

—	X-ray positive	X-ray negative, equivocal, or not done	Total
Multiparæ whose final pregnancy only was associated with colitis	11	5	16
Onset during last pregnancy	4	1	5
Relapse during last pregnancy	2	0	2
Unaffected or improved during last pregnancy	5	4	9

In summary, pregnancy and the puerperium were associated with deterioration in established ulcerative colitis in about a third of the cases; but, if ulcerative colitis was inactive at the beginning of pregnancy, this risk was very small.

Effect of Successive Pregnancies

This was studied in 25 patients, and the results are set forth in table III, which shows that, when more than one pregnancy occurs in a patient with established ulcerative colitis, there is no guarantee that successive pregnancies will behave in the same way as their forerunners. It is therefore impossible to promise a patient who has had a previous uneventful pregnancy that the next will be so harmless; nor should one too emphatically forbid a subsequent pregnancy in a patient who is anxious to have another child.

Table IV sets out the results of pregnancy in patients who get ulcerative colitis rather later in their childbearing career. If pregnancy was truly responsible for initiating colitis in a third of these patients, it is interesting to speculate why it did not start with an earlier pregnancy. This may perhaps be an argument in support of those who favour the psychological theory of the origin of ulcerative colitis. If allowances are made for the small numbers involved, the effects of these later pregnancies on colitis were very much the same as in the main group (table I).

Extent of Colon Affected

Further subdivision of table II (not shown) shows no significant difference in the behaviour of patients with ulcerative colitis affecting the whole colon from those with only part of the colon affected.

Therapeutic Abortion

This was done in 4 cases, but 3 of these patients were not under our care at the relevant time. In 3 patients the operation was done, when the ulcerative colitis was inactive, because of a previous history of exacerbation during pregnancy, and in these patients the ulcerative colitis remained quiet. In 1 patient there were severe symptoms of ulcerative colitis and the pregnancy was terminated for this reason. This was not followed by improvement, and the patient remained in severe relapse for several weeks.

Conclusion

Two-fifths of our female patients with ulcerative colitis have borne children. 26 of these experienced their first symptoms of ulcerative colitis during either gestation or the puerperium, and the great majority of published reports agree that ulcerative colitis developing in the puerperium may include the most severe cases. Crohn (1947) has particularly emphasised this, but first attacks of ulcerative colitis are always more lethal than relapses—e.g., Rice-Oxley and Truelove (1950) found a 19% hospital mortality for first attacks and a mere 4% for relapses. This fact therefore contributes materially to the difficulty of assessing the rôle of pregnancy in the high mortality experienced in this group. For these patients our methods of treatment are restricted to those in use for the management of ulcerative colitis uncomplicated by pregnancy. Kallett (1952) advocates a trial of luteal hormone, but his experience is limited to 2 cases, and he is careful to point out that no conclusion can be drawn from his results, because of the natural tendency to variability in the response of ulcerative colitis to successive pregnancies. The majority opinion is against termination of pregnancy in these cases.

There seems to be no doubt that a woman with ulcerative colitis who wishes to have a child should ordinarily be advised to postpone pregnancy until the colitis is inactive. Sometimes this advice may mean waiting for ever. If so, the patient is probably a candidate for colectomy, and one must then decide whether to advise pregnancy in the hope that there will be no exacerbation (a 70% chance in my series) or to defer pregnancy until colectomy has been done. This latter course is one whose risks have not yet been assessed.

The most interesting feature of the behaviour of ulcerative colitis complicated by pregnancy is the high proportion of cases which go into remission. In this a parallel could be drawn with rheumatoid arthritis, which responds to pregnancy in the same way. The link may be hormonal, for there is strong evidence (Truelove and Witts 1954) that a large percentage of patients with ulcerative colitis give a good clinical response to treatment with either cortisone or corticotrophin, and this is rather like the way it reacts to pregnancy.

Tumen and Cohn (1950) and Almy (1951) offer some evidence that the mental attitude of a woman towards her pregnancy may be important in determining its effect on ulcerative colitis. The universal experience that the course of ulcerative colitis is profoundly influenced by the psychological background lends some support to this view. The satisfaction and fulfilment of successful motherhood might greatly improve the bowel symptoms in this way, and the psychological stress of an unwanted pregnancy could cause a relapse.

Two local factors might affect the course of ulcerative colitis during pregnancy:

(1) The general increase in vascularity of the pelvic organs (including the rectum and the sigmoid colon), which is a feature of pregnancy (Pope 1952). It seems reasonable to suppose that an already bleeding and œdematous rectum would become still more œdematous and bleed even more profusely as a result of this change and thus produce symptomatic deterioration.

(2) The constipation which so often appears in pregnancy. As a result hard fæces in the lumen of an inflamed colon could physically irritate the mucosa. Indeed in non-pregnant women with ulcerative colitis (especially the milder types with only the distal colon affected) we have often found that what the patient describes as "bloody diarrhœa" consists of the passage of frequent small hard stools with much bloody mucus, a symptom which rapidly disappears when the constipation is treated.

The effect of pregnancy on colitis is therefore the resultant of the interplay of systemic, local, and psychological factors, but the relative importance of each remains unknown. This is unfortunately only a special aspect of our general ignorance of the ætiology of this extraordinary disease.

Summary

Pregnancy is often associated with ulcerative colitis; 64 of 244 women with ulcerative colitis had an associated pregnancy.

These 64 women with ulcerative colitis had 100 pregnancies.

In 26 of them the ulcerative colitis began during or immediately after a pregnancy, and this group contained a high proportion of severe cases.

A quarter of all women with ulcerative colitis who had been pregnant had their first attack during either pregnancy or the puerperium.

Inactive colitis was unaffected by pregnancy.

Active colitis was improved in one-half, unaffected in a quarter, and aggravated in a quarter of the pregnancies.

The proportion relapsing rises to a third when the puerperium is included in the time of onset of the ulcerative colitis.

Successive pregnancies do not have consistent effects on ulcerative colitis.

Ulcerative colitis does not adversely affect pregnancy.

I am grateful to the consultant staff of the Gordon Hospital for unrestricted access to the case-records of their patients; and to Dr. Cullinan for his advice and encouragement during the preparation of the paper. I am indebted to Miss H. M. Davies for tracing the patients. This work was done with the assistance of a grant from the Gordon Hospital (Westminster teaching group) research fund

ADDENDUM

B. B. Crohn et al. (*Gastroenterology*, 1956, **35**, 391) have lately published results which are broadly similar to mine, but show a smaller proportion of favourable cases in a considerably larger series.

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ELUTION OF THE RHEUMATOID-ARTHRITIS FACTOR FROM RED-CELL AGGLUTINATES

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IT was shown by Waaler (1940) and Rose et al. (1948), and has since been abundantly confirmed, that serum from patients with rheumatoid arthritis agglutinates sheep red-cells which have been exposed to a subagglutinating dose of homologous antiserum prepared in the rabbit. This property is being increasingly used, as the Rose-Waaler test, in the diagnosis of rheumatoid arthritis, but the factor responsible for this phenomenon has hitherto not been identified. Several workers have reported results from using various serum fractions, with differing conclusions—e.g., Svartz and Schlossmann (1955) found the factor in cryoglobulin, which consisted mainly of γ-globulin; Ziff et al. (1954) found the factor mostly in euglobulin; Heller et al. (1955) found the highest concentration in fraction III and thought the factor resided in β-lipoprotein; and Wager and Alameri (1954) thought it to be a γ-globulin fraction.

Since the presence of the R.A. factor in the serum forms so striking and so specific a feature of rheumatoid arthritis (with very few exceptions), it is clearly desirable that the factor should be isolated and identified. An alternative approach to the isolation of the R.A. factor, and one theoretically more likely than fractionation to yield it in pure state, would be to elute it from the antigen/antibody substrates which it is capable of agglutinating.

Although it has been shown that the R.A. factor is absorbed by the red-cell/antibody complex, no satisfactory method of recovering it has been described. An elution method which shows promise and is under further investigation is described here.

In the course of experiments to investigate the nature of antibody/antigen complexes which would serve as suitable substrates for the R.A. factor it was found that red cells, coated with the capsular polysaccharide of *Bacterium pneumoniæ* type B and subsequently exposed to a subagglutinating dose of rabbit antiserum against whole *Bact. pneumoniæ*, were agglutinated by Rose-Waaler-positive sera. It was then found that, if a dilute solution of *Bact. pneumoniæ* polysaccharide was added to cells so agglutinated, the agglutinates were resolved and the cells became evenly suspended. Moreover, after centrifugation of cells thus treated, the supernatant fluid was capable of agglutinating sensitised cells—i.e., behaved as if it contained free R. A. factor.

A similar effect could be produced by treating with dilute A-substance human group-A cells which had been sensitised with rabbit anti-group-A-substance antibody and subsequently agglutinated by a Rose-Waaler-positive serum.

Experimental

Materials

(1) Sheep red cells obtained from Serum Research Institute, Carshalton.

(2) Serum from patients with rheumatoid arthritis.

(3) Capsular of polysaccharide of *Bact. pneumoniæ* type B prepared according to the method of Heidelberger and Avery (1925) from strain N.C.T.C. 5055.

(4) Rabbit anti-*Bact. pneumoniæ* serum. This was a fluorescein-labelled globulin fraction from immune rabbit serum, which had been prepared for another purpose.

(5) Pneumococcal C-polysaccharide prepared by the method of Anderson and McCarty (1951).

(6) Rabbit anti-group-A serum prepared by inoculating into rabbits streptococci treated with group-A substance (Glynn et al. 1954).

(7) Human group-A substance from ovarian-cyst fluid.

(8) Group-A substance recovered from preparation of hog pepsin.

(9) Group-A substance derived from hog stomach.

(10) Human group-A cells obtained from bottles for transfusion.

(11) M.R.C. pattern 'Perspex' agglutination-trays.

(12) 0·85% sodium chloride was used as the diluent for all the reagents.

Methods

Coating red cells with Bact. pneumoniæ polysaccharide.—A 10% suspension of sheep red cells was added to an equal volume of polysaccharide dissolved in saline solution—usually at 4 mg. per ml. After two hours at 37°C the cells were washed thrice in a large bulk of saline solution.

Titration of sensitising sera (Rabbit anti-Bact. pneumoniæ, anti-A substance, and anti-sheep cell).—Sera were diluted in twofold steps, and to each dilution was added an equal volume of 2% red cells. The highest concentration of serum which produced no agglutination was called one sensitising dose.

Sensitisation of cells.—2% red cells were mixed with an equal volume of the appropriate rabbit antiserum diluted to contain one sensitising dose of antibody. Sensitised cells were used after standing for a few minutes at room-temperature.

Titration of sera, eluates, and supernatants for R.A. factor.—Fluids to be titrated were serially diluted in twofold steps; to each dilution was added an equal volume of 1% sensitised cells. M.R.C.-pattern agglutination-trays were used for all agglutination and inhibition tests. Dilutions were made with a spring-loaded syringe which had been shown to be accurate over the range of dilutions used. The unit volume in all titrations was 0·4 ml., to which was added an equal volume of cells. Agglutination end-points were judged by the pattern of sedimented cells.

Results

Table I shows a titration of an R.A. serum against cells coated with *Bact. pneumoniæ* polysaccharide and sensitised with 1 sensitising dose of anti-*Bact. pneumoniæ* rabbit-serum. It will be seen that the Rose-Waaler phenomenon takes place—i.e., the sensitised cells are agglutinated—although the titre of the serum in the *Bact. pneumoniæ* method was rather lower than in the conventional sheep-red-cell/anti-sheep-red-cell system.

Table II shows the effect of adding to cells, agglutinated as in table I, a small quantity of *Bact. pneumoniæ* polysaccharide. A titration of a R.A. serum was set up in triplicate against sensitised coated cells. The cells in the three rows were allowed to settle completely. Row 1 was left undisturbed; to each tube of row 2 was added 125 μg. of polysaccharide in 0·025 ml. of saline solution; and to each tube of row 3 was added 0·025 ml. of saline solution. The contents of tubes in rows 2 and 3 were thoroughly mixed and the cells allowed to resettle. It will be seen that, in all except the first tube, the

TABLE I—ROSE-WAALER TEST ON RHEUMATOID SERUM WITH SENSITISED *Bact. pneumoniæ* POLYSACCHARIDE-COATED SHEEP-CELLS AS SUBSTRATE

Substrate	Dilution of R.A. serum							
	10	20	40	80	160	320	640	1280
Coated sensitised cells	+	+	+	+	+	+	±	−
Coated unsensitised cells	±	±	−	−	−	−	−	−

+, ±, ±, − degrees of agglutination.

TABLE II—REVERSAL OF AGGLUTINATION IN *Bact. pneumoniæ* POLYSACCHARIDE ROSE'S TEST BY ADDITION OF EXCESS *Bact. pneumoniæ* POLYSACCHARIDE

Row no.	Treatment of agglutinated cells	Dilution of R.A. serum									
		4	8	16	32	64	128	256	512	1024	2048
1	None	+	+	+	+	+	+	+	+	±	−
2	125 μg. of polysaccharide added and cells resuspended	+	tr	−	−	−	−	−	−	−	−
3	Cells resuspended	+	+	+	+	+	+	+	+	±	−

+, ±, tr, −, degrees of agglutination.

agglutination was reversed by the addition of excess polysaccharide.

An analogous effect could be obtained with human group-A cells sensitised with rabbit anti-human-A-substance serum, when the cells, having been agglutinated by R.A. serum, were dispersed by the addition of A substance. Table III illustrates an experiment demonstrating this. A titration of an R.A. serum was set up in septuplicate, and the cells were allowed to settle completely. Row 1 was left undisturbed; to each tube of rows 2–7 A substance (in 0·025 ml. of saline solution) was added in various amounts; and to row 8 0·025 ml. of saline solution only was added. The contents of all the tubes in rows 2–8 were mixed and allowed to settle again. It will be seen from this table that A substance, in all the concentrations used, was capable of reversing the agglutination. As would be expected, it has also been shown that, in conditions where agglutination can be reversed by A substance or by *Bact. pneumoniæ* polysaccharide, these substances will inhibit agglutination if they are added to the R.A. serum before or at the same time as the sensitised cells.

Detection of Free R.A. Factor in Eluates

The following experiment, which was one of many producing similar results, was designed to see whether free R.A. factor was released in the process of the agglutination-reversal by A substance described above:

To 10 ml. of dilute (1 : 128) R.A. serum was added 10 ml. of 1% sensitised human group-A cells. After thirty minutes at

TABLE III—REVERSAL OF AGGLUTINATION OF SENSITISED HUMAN GROUP-A CELLS BY ADDITION OF EXCESS OF HUMAN GROUP-A SUBSTANCE

Row no.	Treatment of agglutinated cells	Dilution of R.A. serum							
		8	16	32	64	128	256	512	1024
1	(and other rows before mixing). None..	+	+	+	+	+	+	+	±
2	125 μg. of A substance added	−	−	−	−	−	−	−	−
3	62 μg. ,, ,,	−	−	−	−	−	−	−	−
4	31 μg. ,, ,,	−	−	−	−	−	−	−	−
5	15 μg. ,, ,,	−	−	−	−	−	−	−	−
6	7 μg. ,, ,,	−	−	−	−	−	−	−	−
7	Cells mixed, no A substance	+	+	+	+	+	±	±	−

+, ±, ±, −, degrees of agglutination.

room-temperature the mixture was gently centrifuged and the supernatant fluid was removed as completely as possible (a sample being kept for titration). There was then added to the precipitated and agglutinated cells (in some cases after they had been washed in 20 ml. of saline solution) 0·5 ml. of saline solution containing 250 μg. of A-substance. The cells were gently resuspended, and within a few minutes the agglutinates were resolved and the cells completely dispersed, judged by the naked eye. After a further thirty minutes at room-temperature with occasional mixing the cells were centrifuged down and the supernatant eluate was titrated for the presence of R.A. factor.

Table IV shows a multiple experiment on these lines in which the various reagents were controlled by being omitted singly from the reactions. The table shows agglutination titres of the original supernatants and of the eluates against sheep cells sensitised with rabbit anti-sheep-cell serum. This system was used, instead of sensitised A cells, to avoid theoretical objections that rabbit anti-group-A antibody might be free in either supernatants or eluates.

The following conclusions may be drawn from a consideration of table IV:

(1) A-substance elutes absorbed R.A. factor from sensitised group-A cells. (see row 2)

(2) Only when all the reagents were present in absorbing and eluating systems was any activity demonstrable in the eluate. Compare rows 8, 6, and 4, in which R.A. serum, sensitisation of the cells, and A substance respectively have been omitted, with row 2, in which all the reagents were present.

(3) The R..A factor is bound sufficiently firmly to the sensitised cells for the complex to withstand washing (cf. rows 2 and 3).

TABLE IV—RECOVERY OF R.A. FACTOR

Absorbing system	Eluant used on cells derived from absorbing system	Fraction titrated	Dilution of titrand							Row no.
			1	2	4	8	16	32	64	
R.A. serum, sensitised cells		Supernatant	+	+	±	tr	−	−	−	1
	A substance	Eluate		+	+	+	+	±	−	2
	A substance (after washing cells)	Eluate		+	+	+	+	±	−	3
	Saline	Eluate		−	−	−	−	−	−	4
R.A. serum, unsensitised cells		Supernatant	+	+	+	±	−	−	−	5
	A substance	Eluate		−	−	−	−	−	−	6
Saline, sensitised cells		Supernatant	−	−	−	−	−	−	−	7
	A substance	Eluate		−	−	−	−	−	−	8

+, ±, tr, −, degrees of agglutination.
Supernatant = supernatant fluid from absorbing system after removal of cells.
Eluate = supernatant from eluting system after removal of cells.

(4) It may be seen, by comparing rows 1 and 5, that the sensitised cells have removed about 2 agglutinating doses from the R.A serum. Row 3 shows that about 32 doses have been recovered in the eluate. The volume of the eluate is $^1/_{16}$th of that of the absorbing mixture; therefore the 32 doses recovered represent about $^3/_8$ of the quantity absorbed. However, the error of this type of calculation is very large, and one can conclude no more than that the recovery-rate is fairly high.

Specificity of Elution of R.A. Factor by A Substance

That the elution brought about by A substance is almost certainly specific is shown by the fact that neither *Bact. pneumoniæ* capsular polysaccharide nor pneumococcal C-polysaccharide will elute the factor from A cells; moreover the ability of a preparation of A substance to act as an eluting agent in the A-cell system is related to its capacity to inhibit agglutination of A-cells by the anti-A serum used for sensitising the cells.

This is shown in the experiments set out in table V.

TABLE V—COMPARISON OF R.A.-FACTOR-ELUTING AND AGGLUTINATION-INHIBITING PROPERTIES OF 3 PREPARATIONS OF A SUBSTANCE

Source of A substance	Time allowed for elution (min.)	Rose-Waaler titre of eluate	Agglutination-inhibition titre of A substance
Hog pepsin ..	30	2	640–1280
	90	2	
Hog stomach ..	30	2	5120–10240
	90	8	
Human	30	32	20480
	90	16–32	

Three preparations of A-substance were used: (1) derived from hog pepsin; (2) derived from hog stomach and only partly purified; and (3) highly purified human A substance. These preparations were used, in the same concentration (500 μg. per ml.), as eluting agents on sensitised group-A cells which had absorbed R.A. factor. The eluates were titrated against sensitised sheep cells, and at the same time the agglutination-inhibition titre of the A-substance preparations against rabbit anti-A serum (2 agglutinating doses) was measured. It will be seen from this table that the amount of R.A. factor which a preparation of A substance could elute was closely related to its agglutination-inhibitor content.

Discussion

It seems highly likely that the agglutinating property of the eluates described in these experiments is in fact due to R.A. factor absorbed to sensitised cells and subsequently eluted from them. Elution of the factor can be brought about, in the circumstances described, only by the antigen specific for the antibody used for sensitising the cells. A simple working hypothesis to explain the elution is as follows:

The R.A. factor attaches itself to the free end of the divalent antibody molecule, the other end of which is attached to the receptor site on the red cell or its coating. The excess antigen subsequently added (i.e., the A substance or *Bact. pneumoniæ* polysaccharide) then displaces the R.A. factor from the antibody.

This is obviously a great simplification and does not account for the comparatively large amount of antigen required to bring about elution—or the fact that the R.A. factor will only attach itself to antibody which is in combination with its antigen. Experiments, not detailed here, have shown that, if the concentration of antigen used for elution is decreased, there is a corresponding decrease in the amount of factor recovered. It is, however, known that a large excess of A substance is required to dissolve A-anti-A precipitates.

Although the process of elution is adequately demonstrated by the concentrations of reagents here described, the conditions are not necessarily optimal. In fact work in progress has improved somewhat on the yields of eluted factor. Since it can be shown that the amount of factor absorbed is within limits proportional to the amount of antibody used for sensitising the cells, it would be logical to use more antibody in the absorbing system. However, this leads to difficulties because the cells are very tightly agglutinated and are made increasingly liable to lysis. Univalent antibody could, of course, be used in high concentration without this difficulty arising. However, fowl cells sensitised with a rabbit anti-fowl-cell antibody rendered incomplete by photo-oxidation (Tyler et al. 1954) were not agglutinated by R.A. serum; nor were sheep cells sensitised by rabbit anti-forssman (anti-fowl) antibody. The possibility of the use of incomplete antibodies has not been thoroughly explored, but perhaps the failure of the two mentioned might be taken as giving some support to the hypothesis of the mechanism of elution stated above.

That the method described above produces a fairly high degree of purification of the R.A. factor relative to other constituents of the serum is shown by the fact that the eluates, while representing a many thousand-fold dilution of the original serum, have nevertheless 1/64–1/32 of its activity. The eluates contain about 4 mg. of protein per 100 ml., measured by specific absorption of ultraviolet light (280 mμ)—i.e., in terms of the protein content of the serum from which they were derived they contain the factor concentrated 30–60-fold. Some at least of the eluate protein, as has been shown by blank experiments, derives from the red cells used for absorption, and it has been possible, in experiments which are at present in a preliminary stage, to achieve a further 5–6-fold concentration of the factor—i.e., a total concentration of 150–360-fold relative to the protein content.

Summary

A method is described of eluting from red-cell agglutinates the factor which is present in serum from patients with rheumatoid arthritis and is responsible for the agglutination of sensitised cells (Rose-Waaler test).

The eluates contain the factor highly concentrated in relation to other constituents of the serum.

I wish to thank Prof. W. T. J. Morgan for providing group-A substances; Dr. A. G. S. Hill for providing anti-*Bact. pneumoniæ* rabbit-globulin and for his general interest and much discussion; Dr. E. J. Holborow for providing rabbit anti-group-A serum; Mr. G. Trinder, of Oxford, with whose serum the bulk of the work was done; Mr. J. Keningale for untiring technical assistance; Dr. R. R. A. Coombs for providing photo-oxidised rabbit serum; and Dr. R. A. Kekwick for measuring the protein concentrates of eluates.

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MILIARY AND MENINGEAL TUBERCULOSIS

DIFFICULTIES IN DIAGNOSIS

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THERE is a danger that the notable decline in the incidence of miliary and meningeal tuberculosis may lead to lessened awareness of these conditions as possible causes of a child's illness. The early diagnosis of tuberculous meningitis is vital; for with early treatment one can guarantee a recovery-rate of over 90% without sequelæ (Lorber 1956), whereas if treatment is delayed until the child is unconscious the risk of death or of serious consequences is greatly increased.

I describe below some of the diagnostic difficulties in 236 cases under my personal care in the Children's Hospital, Sheffield. 192 of these children were admitted with meningitis, and 43 with miliary tuberculosis (of whom 13 developed meningitis while in hospital).

Difficulties in History

The main difficulty is the vagueness and lack of specificity of the early symptoms. Table I shows that by far the commonest presenting symptoms were tiredness, lack of energy, and irritability. These were the initial symptoms in 57% of children. Loss of appetite was the next common early symptom, present in 33%. It is of particular interest that vomiting was a presenting symptom in only 25% and headache in only 28% of those old enough to complain of it—children aged 3 or more. Constipation was an initial symptom in only 5%. This is important, because the triad of headache, vomiting, and constipation has long been thought characteristic of early tuberculous meningitis. The second part of table I shows that, at some stage before admission, these occurred with greater frequency: vomiting in 80%, headache in 73%, and constipation in 34%.

In none of the 13 children who were admitted with miliary tuberculosis and developed meningitis in hospital were there any early symptoms. The diagnosis was made on routine examination of the cerebrospinal fluid (C.S.F.).

Family doctors have told me that, if they had to suspect meningeal tuberculosis each time they saw a child with the symptoms described above, they would have to send half the children in their practice to hospital for investigation. It is true that these symptoms are exceedingly common in children. But it is their progressive nature in the absence of an obvious cause—especially in a child known to be tuberculin-positive or to have been exposed to infection in the previous six months or so—which should arouse the suspicion of tuberculous meningitis and lead to hospital investigation.

A relatively common source of confusion in diagnosis is the occurrence of some injury or infection just before

TABLE I—SYMPTOMS IN TUBERCULOUS MENINGITIS IN 181 PATIENTS

Initial symptoms		Symptoms before admission (initial or otherwise)	
Irritability, lassitude, listlessness	57%	Vomiting	80%
Anorexia	33%	Irritability, listlessness, lassitude	76%
Headache (children of 3 yr. or more)	28%	Headache (children of 3 yr. or more)	73%
Vomiting	25%	Anorexia	62%
Fever	13%	Fever	38%
Cough	12%	Constipation	34%
Weight-loss	9%	Weight-loss	30%
Constipation	5%	Cough	22%
Convulsion	2%	Convulsion	13%
Photophobia	2%	Photophobia	9%

the onset of the symptoms of miliary or meningeal tuberculosis, with the result that the symptoms are wrongly ascribed to slow convalescence from the injury or infection, or to their sequelæ (table II). This difficulty arose in 34 of 184 children with tuberculous meningitis (18%). In 24 of them the confusing factor was an infection such as measles.

Very occasionally an unusually acute onset made the clinical diagnosis of tuberculous meningitis virtually impossible. One child had been well up to two hours before admission, when he had a convulsion. The diagnosis was established by examination of the C.S.F. An unusually long duration of symptoms before admission might well cause the correct diagnosis to be missed. Some children had progressive symptoms for three months before admission and radiography of the chest provided no evidence of miliary tuberculosis.

Difficulties in Physical Signs

Probably the greatest source of confusion in the early diagnosis of tuberculous meningitis is the absence of meningism in many children, especially in young ones and in the early stage of the disease (tables III and IV). Haworth (1953) found that 19 of 50 babies with various forms of meningitis in the first year of life had no sign of meningism. In my series no meningism was found in 25% of the 173 cases in which the presence or absence of meningism was noted. As one would expect,

TABLE II—INJURY OR INFECTION IMMEDIATELY PRECEDING SYMPTOMS OF TUBERCULOUS MENINGITIS IN 184 CHILDREN

Condition	No. of children	
Head injury	8	
Burn or scald	2	
Infection:		
Measles	8	24
Chickenpox	4	
Whooping-cough	4	
Scarlet fever	4	
Tonsillitis otitis	3	
Gastro-enteritis	1	

TABLE III—ABSENCE OF MENINGISM IN RELATION TO AGE IN 43 CHILDREN

Age (yr.)	Percentage without meningism
0–1	35
2–5	23
More than 5	19

meningism was found less often in younger children than in older ones; 35% of those under 2 had no meningism, compared with 19% of those aged 5 or more; and 71% of those in the early stage had no meningism, compared with 14% of those in the later stages. These figures do not include the 13 children who were admitted with miliary tuberculosis and subsequently developed meningitis. None of these had meningism at the time when the meningitis was diagnosed.

The finding of choroidal tubercles virtually establishes the diagnosis of miliary tuberculosis, but they are not found in all cases. We found them in 74% of 74 children whose chest X rays showed miliary tuberculosis, but in only 11% of 113 children whose chest X rays did not show miliary mottling (Illingworth and Lorber 1956). Papillœdema was present on admission in 41% of the children with tuberculous meningitis. It is well known that cranial-nerve palsies are only a late manifestation of the disease. The absence of photophobia should not deter anyone from diagnosing tuberculous meningitis; it was present in only 8% of our cases.

It is of importance that 27% of the children had no pyrexia when first seen by us in the hospital. Many were in a good and normal state of nutrition and did not look at all ill. There was no drowsiness in the early cases. It is easy to understand how readily the diagnosis of tuberculous meningitis can be missed in these circumstances.

Another difficulty in the diagnosis is the presence of otitis media. When an ill child has a discharging ear, it is very easy to make the mistake of ascribing all his symptoms to it, thereby missing the more important tuberculous meningitis. We often saw this difficulty.

It follows that, whenever tuberculous meningitis is suspected, a thorough search for choroidal tubercles will be made; and this necessitates proper sedation. Examina-

TABLE IV—ABSENCE OF MENINGISM IN RELATION TO STAGE OF MENINGITIS

Stage	Percentage without meningism
Early	71
Intermediate	9
Advanced	14

tion for meningism should always be made with the child sitting: the head is conveyed from full extension to full flexion, and any wincing from pain in the lower part of the back is particularly noted as full flexion is achieved.

Finally, even in the absence of choroidal tubercles, meningism, or pyrexia, the possibility of tuberculous meningitis is still borne in mind and special investigations must be carried out.

Difficulties in Special Investigations

Tuberculin Reaction

It is not always realised that, as a result of anergy, the tuberculin reaction is often negative in tuberculous meningitis. The tuberculin-jelly test, performed without abrasive, was negative in 42% of 184 children with miliary or meningeal tuberculosis. It was negative in 49% of children with meningitis without X-ray evidence of miliary spread and in 30% of those with miliary spread. It was negative in 43% of children in the early stage of meningitis, 36% of those in the intermediate stage, and 59% of those in the advanced stage.

We cannot state the proportion of children with a negative Mantoux reaction, because at first this test was not undertaken in all the children. (We now carry out the Mantoux test as a routine in all children in whom we suspect tuberculous meningitis.) Of 66 children with a negative tuberculin-jelly test in whom we carried out a Mantoux test (1 in 1000 or 1 in 100) the Mantoux test was negative in 23 (35%).

In a few children the Mantoux test gave a negative response in forty-eight hours, but a delayed positive appeared in four or five days. This caused serious delay in diagnosis in 1 child.

Sugar in C.S.F.

It is not sufficiently widely realised that in tuberculous meningitis the level of the sugar in the C.S.F. may be normal:

Garland and Phillips (1953) wrote: "The sugar content falls at an early stage to under 50 mgms.% and may entirely disappear"; and Farmer and Janeway (1942): "The sugar content is decreased below 45 mgm.%." On the other hand, Lups and Haan (1954) were more cautious: "The glucose content is rather markedly reduced. The levels are usually lower than 45 mgm.%." Merritt and Fremont-Smith (1937) reported the findings in 264 cases of tuberculous meningitis: in 6·4% the C.S.F. contained more than 50 mg. of sugar per 100 ml. The stage at which the sugar was estimated is not stated.

Table V shows the initial C.S.F.-sugar levels in our 192 cases of tuberculous meningitis, compared with those of

TABLE V—INITIAL C.S.F.-SUGAR LEVEL IN TUBERCULOUS AND PURULENT MENINGITIS AND POLIOMYELITIS

C.S.F.-sugar (mg. per 100 ml.)	Tuberculous meningitis (192 children)	Purulent meningitis (70 children)	Poliomyelitis (50 children)
0–9	7%	40%	0%
10–19	23%	13%	0%
20–29	24%	16%	0%
30–39	20%	7%	0%
40–49	11%	13%	6%
50–59	6%	1%	40%
60–69	4%	3%	34%
70 or more	4%	6%	20%

70 children with purulent meningitis and 50 with poliomyelitis. In 14% of children with tuberculous meningitis the initial C.S.F.-glucose level was 50 mg. per 100 ml. or over.

Table VI relates the level of the initial C.S.F.-sugar to the stage of disease on admission. It will be seen that even in the late stages the sugar was over 40 mg. in 13% of the children.

It is well known that the C.S.F.-sugar tends to be lower in purulent meningitis than in tuberculous meningitis, but the fact that in 7% of our cases of tuberculous meningitis the initial sugar was less than 10 mg. per 100 ml. is worthy of note. Another difficulty lies in the fact that in 10% of our cases of purulent meningitis the initial sugar was 50 mg. or more. Joffe and Wells (1949) reported a C.S.F.-sugar of 50 mg. per 100 ml., or more, in 18% of 72 cases of acute purulent meningitis, and Merritt and Fremont-Smith (1937) in 18% of 966 cases. It is obvious that a normal sugar level excludes neither tuberculous nor purulent meningitis. A particular difficulty is the child who has purulent meningitis, half-treated by sulphonamides or antibiotics before he reaches

TABLE VI—RELATION OF INITIAL C.S.F.-SUGAR LEVEL TO STAGE OF DISEASE ON ADMISSION

C.S.F.-sugar (mg. per 100 ml.)	Early	Intermediate	Advanced
0–19	18%	30%	43%
20–39	51%	41%	43%
40 or more	30%	28%	13%

TABLE VII—ORGANISMS IN MIXED TUBERCULOUS MENINGITIS

Organism	No. of children
Pneumococcus	4
Hæmophilus influenzæ	2
Staphylococcus	1
Meningococcus	1
Total	8

hospital, from whose C.S.F. one cannot recover the organism. The sugar level is apt to be relatively high in these cases. The situation is even more difficult if he has a complicating subdural effusion of fluid when first seen.

One of the main conditions which causes confusion with tuberculous meningitis is poliomyelitis and other virus infections of the nervous system. In 50 consecutive cases of poliomyelitis seen by us, no child had a C.S.F.-sugar of less than 40 mg. per 100 ml.

Joffe and Wells (1949) found the C.S.F.-sugar below 50 mg. in 6% of 122 cases of poliomyelitis. Farmer and Janeway (1942) reported that, in lymphocytic choriomeningitis, the C.S.F.-sugar content is usually normal, although it may be reduced to 35–40 mg. Adler (1940) found levels of 41 and 49 mg. in 2 out of 22 cases of acute encephalitis. Green et al. (1949) found levels of 30 mg. or less in 7 of 21 cases of lymphocytic choriomeningitis. Sawchuk et al. (1949) found levels below 50 mg. in 2 of 41 cases of measles encephalomyelitis. On the other hand, the C.S.F.-sugar was normal in all of 72 cases of measles encephalitis described by Appelbaum et al. (1949) and all of 48 cases described by Litvak et al. (1943).

It should be remembered that the C.S.F.-sugar level may be lowered when the C.S.F. is mixed with blood (Merritt and Fremont-Smith 1937)—it was below 50 mg. per 100 ml. in 10 of 21 cases of subarachnoid hæmorrhage—and it may be much lower than normal in neoplastic involvement of the meninges (Dodge et al. 1952).

Another difficulty in the diagnosis of tuberculous meningitis is tuberculous serous meningitis, which is characterised by meningism in tuberculous children, as a result usually of a tuberculoma, with only slight and transient changes in the C.S.F.

Isolation of Organism

In laboratories in which material from tuberculous children is not often examined, there is often difficulty in identifying the tubercle bacillus in stained smears of C.S.F. or from culture. At the Children's Hospital, Sheffield, we failed to recover the organism in 2 of the 144 children with tuberculous meningitis seen in the last six and a half years; 1 of these had been partly treated elsewhere before we saw him. In 85% we found the organism in a smear of the C.S.F. In all but 2 of the remaining children we obtained it on culture or on guineapig inoculation. The method used at Sheffield was described by Stewart (1953):

Basically her method consists in examining a large quantity of fluid (10–20 ml.), the removal of all but a few drops of fluid after adequate centrifugation, and light staining of a thick film containing the whole of the deposit. By this method she demonstrated the bacilli in the film in 91 of 100 consecutive cases of tuberculous meningitis.

Mixed Meningitis

We have had 8 children with a mixed tuberculous and purulent meningitis. The organisms concerned are shown in table VII. A further complicating feature was the fact that the tuberculin-jelly test was negative in 5 of the 6 children in whom it was performed. One should always suspect a mixed infection if a child with tuberculous meningitis has an unusually low C.S.F.-sugar. Routine search for choroidal tubercles, routine Mantoux testing, radiography of the chest, and a thorough search for tubercle bacilli in the C.S.F. of all children presenting as purulent meningitis help to prevent the mistake. Furthermore, when tubercle bacilli are found in a film,

a routine smear should be stained and an attempt made to culture pyogenic organisms.

Negative X-ray Findings in the Presence of Miliary Tuberculosis

Emery and Lorber (1950) described the lack of correlation between post-mortem evidence of miliary tuberculosis and chest radiography. They showed that miliary tuberculosis was diagnosed radiologically in only 18 of 52 cases in which miliary spread was found at necropsy. A negative X-ray examination therefore by no means excludes miliary tuberculosis.

We saw a child who did not respond to the usual treatment of pneumococcal meningitis. His tuberculin reaction was negative and chest radiograph normal. There were no choroidal tubercles. At necropsy miliary tuberculosis was found.

Cerebral tumour, cerebral abscess, and cerebral venous thrombosis are other conditions which may cause serious difficulty in the diagnosis of tuberculous meningitis.

Conclusion

A Mantoux test (1 in 1000), and not a tuberculin-jelly test, is carried out when tuberculous meningitis is suspected. Particular importance is attached to a positive result in a child recently exposed to tuberculosis, for meningitis is more likely to develop in the six months after exposure than at any other time; and a positive result in a child under 2 years of age should always be taken as signifying active tuberculosis. At the same time a lumbar puncture is done, and one remembers that, though usually the C.S.F.-sugar level is 10–40 mg. per 100 ml., there are occasional variations. By a proper technique acid-fast bacilli will be found in the smear in 90% of cases of tuberculous meningitis, and in the remaining 10% the organism will eventually be demonstrated by culture and guineapig inoculation. The chest is radiographed with the knowledge that a normal radiograph does not exclude tuberculosis. One then weighs up the diagnosis, in the light of the history, the physical examination, and the special investigations.

Summary

On a basis of 236 cases, some of the difficulties in the diagnosis of miliary and meningeal tuberculosis are described. The chief causes of difficulty were:

1. The vagueness of the initial symptoms. The commonest were tiredness, irritability, and loss of appetite. Nutrition may be good, and the child may be neither feverish nor drowsy. Headache and vomiting were usually late symptoms.
2. In 18% of the children there was a history of an injury or infection immediately before the onset of symptoms.
3. In 25% meningism was absent.
4. In 42% a tuberculin-jelly test was negative. The Mantoux reaction was also frequently negative; in some it gave a confusing delayed reaction.
5. In 14% the initial level of sugar in the cerebrospinal fluid was 50 mg. per 100 ml. or more.
6. In 8 children the meningitis was both purulent and tuberculous.
7. In some cases, proved at necropsy to be miliary tuberculosis, nothing abnormal had been seen on X-ray examination.

Steps in the diagnosis of tuberculous meningitis are suggested.

My thanks are due to Dr. J. Lorber, senior lecturer in child health in the University of Sheffield, for his helpful criticism of this paper.

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References continued at foot of next column

THE PHYSICS OF SOME PULMONARY SIGNS

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THIS paper gives some account of the way in which the voice and the glottic breath sounds are modified in passing through the lung and chest wall, and of the variation of sound transmission in disease.

Method

The principle is illustrated in fig. 1. Pure tones of controlled pitch and loudness are fed into the subject's

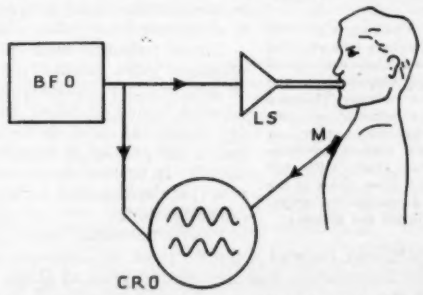

Fig. 1—The experimental arrangement. The beat-frequency oscillator (BFO) driving the loudspeaker (LS). The waveform from the amplified output of the microphone (M) compared with that of the oscillator on the cathode-ray oscilloscope (CRO).

airways by means of a loudspeaker attached to the mouthpiece through which he breathes. The transmitted sound is picked up by a microphone applied to the chest wall, and the electrical waveform is displayed on an oscilloscope for photographing and measurement. In this way, a graph of sound transmission at different frequencies is easily constructed.

Because of interference by the heart-sounds, the method is not practicable for tones below about 100 cycles per second (c/s), and frequencies below this were removed from the microphone output by a filter.

In spite of cotton-wool lagging of the speaker and most of the mouthpiece, some sound reached the microphone without passing the subject's lungs. This stray sound could be measured when the subject closed his glottis, and was allowed for (fig. 2). The lagging of the mouthpiece opening imposed some resistance to breathing and, to avoid variations of the speaker output due to pressure changes, the sound trace was routinely photographed in mid-inspiration.

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Results

Typical normal transmission is shown in fig. 3. The main feature is the rapid attenuation of sound with increasing frequency. This pattern was found over most of the chest, but in the pectoral region the transmission at 100 c/s was less than at 200 c/s—presumably because of local anatomical factors.

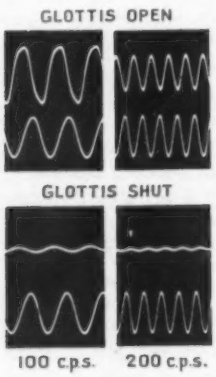

Fig. 2—Photographs of oscilloscope face showing in each case the microphone output above the reference trace. The drop in amplitude of the microphone output on glottic closure demonstrates that, with the glottis open, most of the sound reaches the microphone via the airways.

The phase of the transmitted sound was compared with that of the stray sound. It was found that there was always less shift of phase in the transmitted sound (fig. 4).

Two patients with bronchial breathing over consolidated lung were studied: the results of the more clear-cut example are shown in fig. 5. The transmission of the higher frequencies is obviously better than normal.

Three patients with pleural effusions gave similar patterns of abnormality—namely, transmission much reduced at low frequencies and somewhat enhanced at higher frequencies (fig. 6). In none of these patients was there evidence of underlying consolidation.

Four patients with total pneumothorax showed some decrease of transmission at medium frequencies, and an isolated peak at about 700–800 c/s (fig. 7).

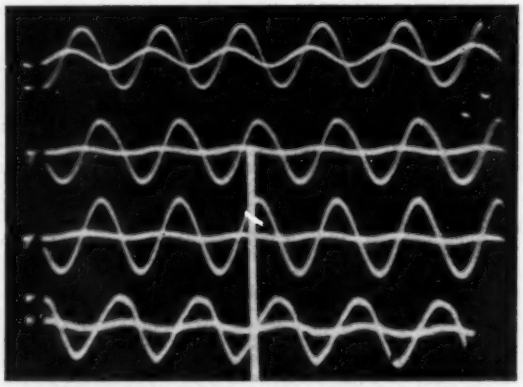

Fig. 4—Synchronised records of sound (200 c/s) over (from above down) trachea, pectoral, axillary, and basal regions; in each case with open and closed glottis. Temporal alignment shown by the vertical bar. The phase of the transmitted sound shifts less than that of the stray sound as the recording site moves away from the trachea.

Discussion

In interpreting the classical physical signs in terms of these results, we have to consider the frequency distribution of energy in the sound source—i.e., the voice or the glottic hiss and whisper, the sensitivity at different frequencies of the hand and ear, and the transmission characteristics of the thorax. The bulk of the acoustic energy in speech lies below 300 c/s, but the glottic hiss contains energy fairly evenly distributed to 5000 c/s or so. Recognition of whispered speech, which is a modulated hiss, will depend on reception of frequencies above 400 c/s. Below about 1000 c/s the sensitivity of the ear steadily decreases with frequency, hence large changes in acoustic energy at the lower end of the range may alter a mixed sound less conspicuously than smaller changes at the upper end. The hand is of course much less sensitive than the ear, but the lower frequencies are relatively better appreciated.

Thus, for example, vocal fremitus depends mainly on adequate transmission of the energy normally present at 100–200 c/s. It will not be found if the voice is too high pitched, and it will disappear when low-frequency transmission is impaired by pleural effusion.

Enhanced high-frequency transmission is probably best demonstrated by increased intelligibility of whispered speech. The retention of the normally lost higher frequencies of the glottic hiss is responsible for "bronchial" quality of breath sounds, the full pattern of bronchial breathing requiring in addition the loss of the locally produced inspiratory souffle.

The mechanism by which the transmitted sound is normally modified remains obscure. On the theory of wave-filters, the small phase shift suggests reactive rather than resistive attenuation. The striking effect that may be produced by a thin layer of pleural fluid

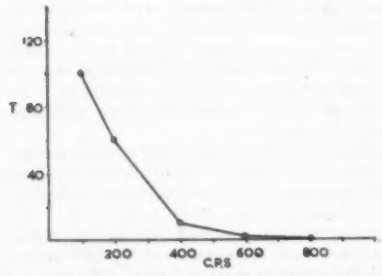

Fig. 3—Normal sound transmission. Amplitude of the transmitted sound-wave plotted against frequency in cycles per second. Transmission at 100 c/s is taken as 100 %.

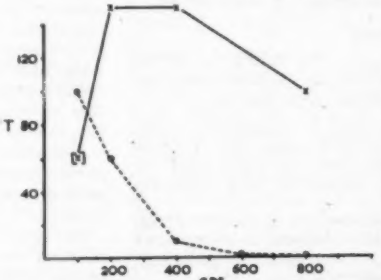

Fig. 5—Transmission in consolidation. The amplitude on the normal side at 100 c/s is taken as 100 %, and normal transmission is indicated by the dotted line. The transmitted sound at 100 c/s on the abnormal side contained harmonics, and its measurement is uncertain.

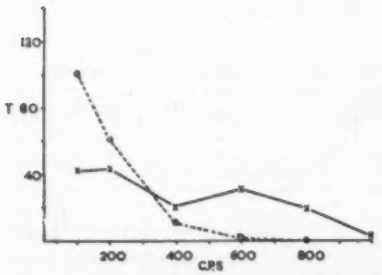

Fig. 6—Transmission in massive pleural effusion plotted as in fig. 5.

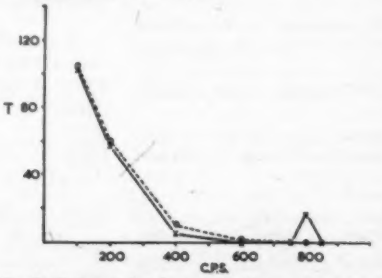

Fig. 7—Transmission in pneumothorax plotted as in figs. 5 and 6.

suggests that an impedance mismatch at the lung chest-wall boundary is a major factor.

These results have broadly confirmed auditory analysis, but we have found the confidence given by their objective support of value in teaching. In these days of high-fidelity sound reproduction most students have some knowledge of acoustics, and in fact respond better to formulations of physical signs in terms of bass cuts and treble lifts than to the traditional jargon.

Summary

(1) The attenuation of sound passing from the air passages through the lungs to the chest-wall has been studied.

(2) The normal thorax produces strong attenuation of higher frequencies.

(3) Characteristic alterations of transmission have been found in disease. The relation of these to the classical physical signs is discussed.

We are indebted to Dr. W. Cochrane and Dr. L. Bellwood of the physics department, St. Thomas's Hospital Medical School, for the loan of apparatus.

TREATMENT OF ACUTE PANCREATITIS WITH CORTISONE

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THE diagnosis and treatment of acute pancreatitis present many difficulties. It is generally agreed that acute œdematous pancreatitis is not associated with a high mortality and should be treated medically. The hæmorrhagic and necrotic type, on the other hand, is often fatal, and the outcome does not appear to be influenced by the therapy; but fortunately this type does not account for a high percentage of patients with acute pancreatitis. Thus, though the general trend in therapy has been towards conservative medical measures, difficulties in diagnosis frequently compel recourse to surgery by which the presence of hæmorrhagic and necrotic pancreatitis may be confirmed and other conditions amenable to surgery excluded.

Our experience of four successive deaths from necrosis of the pancreas led us to try cortisone, whose use in acute pancreatitis was reported by Stephenson et al. (1952). Two of our patients, who from our experience seemed likely to die, made dramatic recoveries. We therefore report here our observations on six patients with acute pancreatitis treated with cortisone in addition to the usual supportive measures.

Case-reports

Case 1.—A man, aged 45, was admitted with five hours' history of severe epigastric pain radiating to his back and associated with nausea and vomiting.

On examination he was pale and sweating, with temperature 100°F, pulse-rate 85, and blood-pressure 120/80 mm. Hg. Tenderness and muscle guarding were present in his upper abdomen.

Laboratory investigations revealed Hb 12 g. per 100 ml., white cells 14,300 per c.mm., serum-amylase 127 units per 100 ml., serum-sodium 142 m.eq. per litre, serum-potassium 3·9 m.eq. per litre, and serum-chloride 115 m.eq. per litre.

Operation.—Twelve hours after admission, in view of his persistent pain and absence of a definite diagnosis, laparotomy was done. Free fluid was present in the peritoneal cavity, and the pancreas was found to be thickened and œdematous throughout its length, yellow-green, and spotted with fat-necrosis. The gall-bladder was normal. The abdomen was closed, with drainage of the lesser sac. The concentration of amylase in the peritoneal fluid was greater than 1000 units per 100 ml., and of lipase 1·8 Cherry-Crandall units per ml.

Therapy.—In addition to intravenous fluids and gastric suction the patient was given penicillin 300,000 units b.d. and streptomycin 0·5 g. b.d. for eight days. On his return from the operating-theatre hydrocortisone 15 mg. was administered intramuscularly and prednisone 25 mg. daily was given in divided doses by mouth for five days, after which the dosage was slowly diminished to cease sixteen days after operation, a total of 275 mg. having been administered.

Progress.—The patient remained pyrexial (about 100°F) but in good general condition for five days after the operation. He then became apyrexial and was discharged home on the twelfth day after his admission to hospital. Four months later he was well, having had no recurrence of his symptoms.

Comment.—Moderately severe œdematous pancreatitis without evident biliary pathology or alcoholic antecedents, with rapid recovery, such as may follow many different forms of treatment.

Case 2.—A woman, aged 36, was admitted with nine hours' history of severe epigastric pain and vomiting unrelieved by morphine and atropine, pain in her left shoulder, and abdominal rigidity.

On examination she was mildly shocked and had a very tender epigastrium, rapid respiration, pulse-rate 95, temperature 99°F, and blood-pressure 120/90 mm. Hg.

Laboratory investigations revealed albuminuria, serum-amylase 716 units per 100 ml. and serum-lipase 2·8 Cherry-Crandall units per ml.

Laparotomy revealed hæmorrhagic fluid in the greater and lesser sacs, fat-necrosis of the omentum, and a pancreas swollen to twice the normal size and covered with areas of fat-necrosis and many hæmorrhagic black areas. The gall-bladder contained a few small stones, but the common duct was not distended. The wound was closed, with drainage of the lesser sac; the patient was in an extremely grave condition. A note was made "Judged on previous cases, I would expect this to be fatal." The peritoneal fluid contained amylase 1250 units per 100 ml. and lipase 5·0 Cherry-Crandall units per ml.

Therapy.—In addition to intravenous fluids and gastric suction penicillin 300,000 units b.d., streptomycin 0·5 g. b.d., propantheline, and pethidine as necessary were given. Intramuscular hydrocortisone 50 mg. was administered on the patient's return from the operating-theatre, and prednisone 20 mg. daily was given in divided doses.

Progress.—For twenty-four hours the patient's condition remained grave; she was oliguric, and her blood-pressure was only maintained by giving *l*-noradrenaline, but thereafter, she made a rapid and striking recovery. The *l*-noradrenaline was discontinued after twenty-four hours, and the gastric suction and intravenous drips at the end of the third postoperative day. The serum-amylase level was 51 units per 100 ml. on the seventh postoperative day. The patient was apyrexial by the fourth postoperative day and discharged to convalescence on the twenty-eighth day after her admission to hospital and told to take prednisone 5 mg. daily for a further fourteen days.

Comment.—This patient had severe hæmorrhagic pancreatitis of the type which we had usually associated with an extremely high mortality and for twenty-four hours her condition was such that we did not think that she would recover.

Case 3.—A man, aged 47, had undergone cholecystectomy twenty-one days previously in another hospital. Shortly before discharge he complained of intermittent pain under his left costal margin and radiating to his back. Anorexia with vomiting had persisted for a week, and he was therefore transferred for further investigation to the General Hospital.

On admission he was pale and dehydrated. He had severe flatulence, pulse-rate 120, blood-pressure 150/115 mm. Hg, signs of bronchitis and a pleural rub at the right base, and tenderness over the upper part of his abdomen.

Laboratory investigations showed red cells 4,380,000 per c.mm., Hb 89%, white cells 18,000–24,000 per c.mm., considerable albuminuria and serum-amylase levels of 718, 742, 418, and 860 units per 100 ml. on successive days.

Laparotomy revealed a large amount of fluid stained by bile and blood. Drainage tubes were inserted in three places

and necrotic pancreatic tissue subsequently discharged through them.

Therapy.—In addition to parenteral fluids and gastric suction the patient was given tetracycline 250 mg. six-hourly for ten days followed by erythromycin 200 mg. q.d.s. for five days. Intramuscular hydrocortisone 50 mg. was administered followed by prednisone 25 mg. in divided doses for fourteen days, the dosage being decreased over the succeeding sixteen days, a total of 500 mg. having been administered.

Progress.—After the operation the patient's clinical condition rapidly improved; his serum-amylase level fell to 118 units per 100 ml. on the third postoperative day. His convalescence was delayed by the formation of an intraperitoneal abscess necessitating drainage in the seventh postoperative week and by enteritis due to a penicillin-resistant staphylococcus. He was discharged in the ninth postoperative week, when fat-absorption tests were normal.

Comment.—**This patient was gravely ill with necrotic pancreatitis and made a striking clinical improvement under cortisone therapy.**

Case 4.—A woman, aged 55, was admitted with eight hours' history of upper abdominal pain of sudden onset. She had had similar attacks relieved by eructation.

On examination she was pale and had a furred tongue, pulse-rate 76, blood-pressure 130/80 mm. Hg, and tenderness and rigidity in the upper part of her abdomen.

Laboratory investigations revealed Hb 97%, white cells 12,800 per c.mm., and serum-amylase 1360 units per 100 ml.

Therapy.—The patient was not operated on but was given tetracycline 250 mg. six-hourly for ten days and prednisone 25 mg. daily in divided doses for a week, followed by diminishing doses for nine further days.

Progress.—Her condition improved steadily, and her serum-amylase level fell to 785 units and finally to 55 units per 100 ml. twelve days after admission. Apart from a mild exacerbation of pain a week after admission, she was asymptomatic for the eighteen hospital days, of which ten were spent in the convalescent annexe.

Comment.—**Moderate œdematous pancreatitis responding rapidly to treatment.**

Case 5.—A man, aged 56, was admitted with severe epigastric pain of two days' duration, associated with vomiting and a past history of indigestion.

On examination he was retching and had a furred tongue, temperature 100°F, pulse-rate 124, respirations 24 a minute, and blood-pressure 188/80 mm. Hg. His epigastrium was tender, with guarding but no rigidity.

Laboratory investigations showed serum-amylase 892 units per 100 ml., Hb 120%, serum-sodium 137 m.eq. per litre, serum-potassium 5·7 m.eq. per litre, and serum-chloride 104 m.eq. per litre. Acute pancreatitis was diagnosed.

Therapy.—Morphine and atropine were given six-hourly for six doses and prednisone 25 mg. daily in divided doses for a week together with propantheline 50 mg. b.d.

Progress.—The patient rapidly became asymptomatic, and on the fourth hospital day his serum-amylase level was 67 units per 100 ml., and he was discharged on his tenth hospital day.

Comment.—**Severe recurrent pancreatitis, presumably œdematous, reacting rapidly to therapy.**

Case 6.—A man, aged 73, was admitted with epigastric pain thirty-six hours' duration of sudden onset and with a history of recurrent attacks of abdominal pain for the previous twelve months.

On examination he appeared gravely ill and had a furred tongue, moderate dehydration, pulse-rate 92, blood-pressure 180/120 mm. Hg, and a tender and rigid upper abdomen.

Laboratory investigations showed a serum-amylase level of 700 units per 100 ml. and Hb 116%. Acute pancreatitis was diagnosed.

Therapy.—In addition to parenteral fluids the patient was given streptomycin 1 g. b.d. for three days, penicillin 2 mega units daily for fourteen days, prednisone 25 mg. in divided doses for four days, followed by 15 mg. for four days.

Progress.—Within twenty-four hours the patient was sitting up, and his abdomen was soft though somewhat distended. He was asymptomatic by the fourth hospital day. On the sixth hospital day his serum-amylase level had fallen to 105 units per 100 ml. He was discharged to convalescence on the tenth hospital day.

Comment.—**Severe acute recurrent pancreatitis which rapidly responded to therapy.**

Discussion

Stephenson et al. (1952) reported the effects of cortisone in a woman, aged 25, with acute hæmorrhagic pancreatitis. From their summary it is evident that they did not wish to make any extravagant claim:

"Included in our therapy was the use of cortisone at a point in her disease when severe shock was present and death appeared imminent. The recovery of the patient appears to have been influenced favourably by the cortisone."

No other report of such a use of cortisone was published until that of Eskwith et al. (1955) on a man, aged 40, with acute hæmorrhagic pancreatitis of moderate severity. These workers comment:

"The improvement on cortisone, as judged by general appearance, relief of pain and increase in appetite was striking."

Two other favourable comments have appeared: Elman (1955) suggested that cortisone might offer prospects of successful treatment in some cases; and Jones (1955) drew attention to its use, remarking that it had appeared to be life-saving in two of his patients.

In our own series it seemed that two at least of our patients were likely to die, and that a rapid improvement dated from the administration of cortisone. Of the other four patients it can only be said that their recovery was rapid, but such recovery could have taken place in patients not so treated. In the absence of further evidence it is impossible to do more than speculate on the possible mode of action of cortisone, whether it be mainly inhibitory on the pancreatic enzymes or œdema formation or a more general action combating possible adrenal failure.

This method of treatment appears to merit careful consideration as a potentially beneficial therapy for a condition which can be refractory to any treatment and is often fatal.

Summary

Six cases of acute pancreatitis are reported, of which two were necrotic.

The rate of recovery appeared to be favourably influenced by cortisone therapy.

We wish to thank the surgeons of the General Hospital, Birmingham, for their coöperation and for permission to publish.

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A FATAL CASE OF TETANUS

TREATED BY SUXAMETHONIUM CHLORIDE, TRACHEOTOMY, AND INTERMITTENT POSITIVE-PRESSURE RESPIRATION

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THE use of relaxants in the treatment of tetanus is well established (Woolmer and Cates 1952, Forrester 1954). The following case, in which suxamethonium chloride (succinylcholine) and intermittent positive-pressure respiration were used, is reported because of the emphasis it lays on pulmonary infection as a continuing hazard in tetanus—a hazard perhaps increased by tracheotomy and mechanical respiration.

Case-report

An unemployed labourer, aged 28, fell on Feb. 29, 1956, at the onset of one of his infrequent epileptic attacks, and struck his nose on a slab of concrete in which some rusty wire was embedded. He was treated at a hospital and returned on March 5 for further attention, when he was given prophylactic antitetanic serum (A.T.S.) for the first time. Eight days later he went to the hospital with five days' history of gradually increasing stiffness of the jaw. Tetanus was diagnosed, and he was transferred to Rush Green Hospital.

On admission he was in tonic spasm, with moderate opisthotonus. His jaws were tightly closed, making articulation and swallowing difficult. His chest wall did not move freely (though there was no cyanosis), and his abdomen was rigid. He could move his arms and legs, and their tone was normal. His temperature was 99·4°F, and he was perspiring freely. His blood-pressure was 106/66 mm. Hg, heart sounds being normal.

A.T.S. 100,000 units was given by intravenous drip through polyethylene tubing; paraldehyde 5 ml. and pethidine 50 mg. intramuscularly, and penicillin 500,000 units two-hourly.

For the next two days there was no change in his condition. Sedation was continued by the regular administration of pethidine and chlorpromazine. A further 100,000 units of A.T.S. was given intravenously. On the morning of March 16 he developed severe widespread tonic spasms, followed by violent clonic spasm, finally leading to respiratory obstruction. Suxamethonium chloride 50 mg. was given intravenously to obtain relaxation, during which a cuffed endotracheal tube was passed, and the patient was kept under gas, oxygen, and trichloroethylene anæsthesia while a tracheotomy was performed.

Aims of Treatment

From this point the aims of treatment were (1) to achieve sufficent muscular relaxation to prevent spasm by using continuous intravenous suxamethonium chloride; (2) to maintain respiratory exchange by intermittent positive-pressure through a Radcliffe pump and cuffed tracheotomy tube; (3) to secure adequate sedation with pethidine and chlorpromazine; (4) to maintain nutrition by giving a special mixture of calories and vitamins through an indwelling nasal tube; and (5) to prevent pulmonary complications by giving antibiotics, postural treatment, suction through the tracheostome, and aerosols.

Suxamethonium chloride.—The aim was to keep the patient on the verge of complete apnœa. At intervals the suxamethonium-chloride drip was slowed to its lowest possible rate and the respirator turned off briefly to ensure that the dosage of relaxant was not excessive. Daily the suxamethonium-chloride drip was turned off while the vein was kept open by another bottle in circuit, and note made of the time that elapsed to the onset of tonic spasm. At first this was about twenty minutes, but later it varied up to a few hours or more.

As swallowing was impossible, the patient was fed by nasal tube throughout. Sulphacetamide drops were instilled into his eyes three times daily to prevent infection, because the eyelids were of necessity paralysed.

The initial dosage of suxamethonium chloride was 3000 mg. per bottle of fluid (540 ml.)—a solution of about 0·5%. This was gradually reduced to 2000 mg. and later to 1000 mg., but it was not always possible to maintain the change from a larger to a smaller dosage, because the degree of spasm sometimes increased considerably with a smaller dosage. A syringe filled with suxamethonium chloride was always at hand in case of emergency. The rate of flow was about 10 drops a minute (3·25 mg. a minute in a bottle of 3000 mg.) and was speeded up whenever external stimuli threatened to produce a spasm. Altogether the patient received 42·5 g. of suxamethonium chloride by intravenous infusion, plus 250 mg. by direct intravenous injection (total 42·75 g.) in six days.

Respirator.—A Radcliffe pump was used because of its reliability. A spare respirator was always at hand. A minute volume of 8–11 litres with a respiratory rate of 18 a minute was maintained; additional cylinder oxygen was not used. The carbon-dioxide combining-power was 45–47 volumes per 100 ml. The blood-pressure fluctuated a great deal but could, in the early stages, be controlled by adjusting the ventilation. At times, when spasm was worse, it was necessary to increase the pressure at which air was delivered. This was probably due to the increased rigidity of the chest wall. Spirometer and blood-pressure readings were taken hourly.

Pethidine and chlorpromazine.—Fairly deep sedation was maintained both to diminish the considerable anxiety which the patient must have been feeling and to reduce the pain of spasm. The dosage at first was pethidine 100 mg. and chlorpromazine 25 mg. intramuscularly four-hourly. Gradually the dosage was reduced and given six-hourly (Cole and Robertson 1955). Obviously it was difficult to assess not only the degree of consciousness of the patient but also his subjective sensations at any given time.

Nasal feeding.—The indwelling nasal tube helped to prevent dilatation of the stomach, which it was felt might arise as sometimes happens in respiratory poliomyelitis.

Pulmonary complications.—Penicillin was given in high dosage. The foot of the bed was not raised. The patient's position was changed from side to side two-hourly. Suction through the tracheotomy tube was applied regularly, and the tube was changed daily. Swabs from the material sucked out were cultured to discover any organism likely to be responsible for infection. On one occasion the predominant organism was a coliform bacterium, and at a later date *Pseudomonas pyocyanea* was grown. Frequent chest radiographs were taken. 'Alevair' was sprayed down the tracheotomy tube at intervals to liquefy secretion in the lungs.

Course

The patient developed pyrexia of about 100–102°F three days after admission and shortly after the tracheotomy was performed. This developed into hyperpyrexia forty-eight hours before his death on March 24. At the same time his blood-pressure fell rapidly, being at times unrecordable. Ice-packs and an electric fan reduced the hyperpyrexia somewhat, and a noradrenaline drip controlled the falling blood-pressure to some extent. During the last forty-eight hours he received no suxamethonium chloride yet had no spasms. Blood-culture at the onset of hyperpyrexia revealed a growth of *Proteus morganii* moderately sensitive to chloramphenicol and insensitive to all other antibiotics tried. Intravenous chloramphenicol produced no improvement. Up to the last forty-eight hours there had been a gradual improvement in the tetanus. Suxamethonium chloride was then being given at a rate of 1000 mg. per 540 ml. (12 drops a minute). There was only a very slight degree of spasm, which was being well controlled.

Post mortem the only significant finding was congestion of the lungs, with areas of bronchopneumonic consolidation and pus in the bronchi. Cultures were not taken, but no evidence of septicæmia was noted.

Comments

Our principal conclusion is that generalised tetanus should be treated in a respiratory-poliomyelitis unit where the staff are skilled in the management of patients receiving intermittent positive-pressure respiration. If the patient is well sedated, and if the transfer is supervised by the staff from the receiving unit, no major difficulties should arise.

Once again it is necessary to emphasise the importance of prophylactic A.T.S. in all cases open to the possibility of tetanus.

We believe our patient died from a septicæmia and bronchopneumonia; for the clinical evidence suggested that the tetanus had run its course.

Although the case ended fatally, we believe that, where respiratory obstruction threatens, early tracheotomy, with sedation and relaxation, offers the best chance of survival. Death is most likely to take place from pulmonary complications, and measures to prevent and treat them are of first importance.

We should like to thank Dr. E. James, under whose care the patient was admitted, and Dr. D. McKendrick, of St. Ann's Hospital, Tottenham, for their help.

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FACTORS INFLUENCING BACTERÆMIA FOLLOWING DENTAL EXTRACTION

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THAT a transient bacteræmia follows dental extraction has been well recognised for many years. The bacteræmia so produced is liable to give rise to subacute bacterial endocarditis in susceptible people. Selbie et al. (1949) investigated the types of *Streptococcus viridans* isolated from cases of subacute bacterial endocarditis and those isolated from the teeth and throats of healthy people.

We have investigated factors which might influence the frequency with which organisms can be recovered from the blood-stream after dental extraction.

Material and Methods

To simplify the investigation only simple extractions were studied. Because local anæsthesia introduces such factors as local vasoconstriction and œdema, which might prevent or provoke bacteræmia, all the extractions studied were done under general anæsthesia with nitrous oxide. No antibiotic cover was used—any patient requiring such cover was excluded from the series.

958 patients of both sexes were investigated. Most of them were outpatients, but a very small number were ward patients under treatment for non-infective illnesses.

In all the cases the degree and type of infection of the patients' mouths and the ease of the operation were assessed by the same worker (F. C.). The extractions were classified as E (unusually easy); N (normal); D (slightly more difficult than usual); and D+ (unusually difficult). Since the ease of extraction depends in great measure on the number of roots possessed by a tooth, this number was used to assess the number of extractions as well as the actual number of individual teeth.

It was found to be impracticable in a busy outpatient department to adopt any special method of sterilising the skin. All the specimens of blood were taken with a sterile metal-and-glass syringe, fitted with a no. 12 hypodermic needle, by puncturing the antecubital vein without cleaning the skin. Bottles containing 50 ml. of digest broth, 2% glucose, and 0·005% *p*-aminobenzoic acid were inoculated through the sterile rubber cap with 5 ml. of blood. This procedure did not lead to a high contamination-rate, provided that the veins were entered at the first attempt. Samples of blood were taken from all the patients during or immediately after the operation, and the time from starting the extraction to finishing taking blood samples was recorded in most cases; but occasionally difficulties arose which made it necessary to concentrate on the operation. As a result, in 206 cases the time of taking the specimens of blood was not recorded; in only 1 of these was a positive culture obtained. In most cases only 1 sample of blood was taken, but from a few patients 2 or more samples were collected. In all, 1223 specimens were examined. In 1 case blood was taken by cardiac catheter.

The treatment of each patient was decided in the usual manner and was not modified for the sake of the investigation. The number of operators was kept small and, except for 12 extractions done by students, were done by dental surgeons.

TABLE I—ORGANISMS AND THEIR INCIDENCE IN 1223 SAMPLES OF BLOOD

Organism	No. of isolations	% of total isolations	% of all cultures
Strep. viridans	110	44·2	8·9
Non-hæmolytic streptococci	26	10·4	2·12
β-Hæmolytic streptococci	3	1·2	0·24
Hæmophilus parainfluenzæ	5	2·0	0·40
Micrococci	53	21·3	4·33
Bacterium pneumoniæ	2	0·8	0·16
Diphtheroids	8	3·2	0·64
Staphylococcus albus	4	1·6	0·32
Staph. aureus	2	0·8	0·16
Monilia	1	0·4	0·08
Bacillus subtilis	4	1·6	0·32
Contaminants	31	12·5	2·53

Cultures.—The first 200 specimens of blood examined were cultured at 37°C aerobically and anaerobically in a McIntosh and Fildes jar. Subcultures were made every forty-eight hours for a week on to 5% horse blood-agar plates, which were incubated aerobically and anaerobically for forty-eight hours. Cultures were regarded as sterile and discarded if no growth was observed in that time. No anaerobic organisms were isolated from the first 200 specimens; so it was decided to dispense with primary anaerobic cultures. All the remaining specimens were incubated aerobically only, but all subcultures on blood-agar plates were incubated aerobically and anaerobically as described.

Results

Bacteriology

Organisms were isolated from 249 of the 1223 samples of blood taken from 958 patients, the type of organism and its incidence being shown in table I.

In the early part of the investigation 31 positive cultures were thought to be contaminants, for the organisms isolated were those commonly found on the skin but rarely found in either healthy or infected mouths. These were not adequately investigated but have been included for completeness. Thereafter such organisms were included in the series, but it is impossible to prove or disprove their origin from the blood-stream.

Blood-cultures were positive in 26% of cases; but, if the probable skin contaminants are excluded, the figure is 15%. This figure is much lower than those of other workers with adequate comparable series (Okell and Elliott 1935, McEntegart and Porterfield 1949).

Number of Roots Extracted

Table II shows that the greater the number of roots removed the greater was the incidence of positive blood-

TABLE II—RELATION OF NUMBER OF ROOTS EXTRACTED TO BACTERÆMIA

No. of roots extracted	No. of patients	No. of positive blood-cultures
1	125	10 (*8·0%*)
2	235	20 (*8·6%*)
3	184	33 (*17·4%*)
4	122	26 (*21·3%*)
5	91	18 (*19·8%*)
6	65	12 (*18·4%*)
7	43	6 (*14·0%*)
8	28	6 (*21·4%*)
9	20	5 (*25·0%*)
10	10	1 (*10·0%*)
11	3	1
12	3	1
13	2	0
14	4	2
15	2	0
16	1	0
17	2	0
18	2	1
19	4	0
20	1	0
21	1	0
24	2	1
29	2	0
30	2	1
31	1	0

cultures. However, the number of roots above 7 is too small to be significant.

In a series as large as this the number of cases in which single individual teeth were removed is great enough for valid comparison, and from the clinical aspect this is of much more practical value than the number of roots removed. Table III shows that a striking pattern is produced. An incidence of 8·1% positive blood-cultures was produced by premolars and 9·28% by lower molars. The high incidence of 14·57% for upper molars can probably be explained by the method used for their extraction. As usually removed they are "rocked"—i.e., the tooth is partially dislocated by the forceps into the cheek, returned into the socket, and then, sometimes, taken towards the palate. This process is repeated until the tooth is completely freed. One can imagine the palatal root coming out of its socket and the tissue-fluid and blood from the ruptured vessels flowing into the space so created. When the tooth is returned rapidly to its original position it forces these fluids—now infected from the lymphatics of the peridontal membrane—back into

TABLE III—TYPE OF TOOTH EXTRACTED IN RELATION TO BACTERÆMIA

Single-tooth extractions	No. of patients	No. of positive blood-cultures
Incisors	15	0
Canines	14	0
Premolars	74	6 (*8·1%*)
Upper molars	103	15 (*14·6%*)
Lower molars	140	13 (*9·3%*)

the blood-stream. Thus the palatal root acts as a plunger in a syringe. The more rapid and vigorous the "rocking" the greater is the efficiency of the syringe.

Trauma

The degree of trauma inflicted during extraction has been correlated with the number of positive blood-cultures (table IV), which shows that the most difficult extractions had the highest incidence of bacteræmia, which might be expected. More surprising was the fact that teeth which were exceptionally easy to remove were also responsible for a large number of positive blood-cultures. These teeth were easy to remove because they and their supporting structures were grossly infected and had an increased blood-supply due to acute inflammation.

Time of Taking Samples of Blood

The time of taking samples of blood was correlated with the number of positive blood-cultures (table v).

TABLE IV—DEGREE OF TRAUMA RELATED TO BACTERÆMIA

Ease of extraction	No. of patients	No. of positive blood-cultures
E	71	18 (*24·0%*)
N	675	80 (*11·8%*)
D	150	28 (*18·5%*)
D+	62	18 (*29·0%*)

Most of the specimens were taken in the first three minutes, and the highest incidence of bacteræmia is in the third minute. These results suggest that we may have taken many samples too early, and that more cultures would have been positive had they been taken in the third minute or later. But equally it might be said that at three minutes more teeth had been removed, with a greater chance of bacteræmia. In view of the circulation-time of the blood this latter view is probably the more correct.

Infection

A large part of dental work is the treatment of dental caries, pyorrhœa, and acute abscesses which may arise from either of the first two diseases.

TABLE V—TIME OF SAMPLING IN RELATION TO BACTERÆMIA

Time blood taken after extraction (min.)	No. of specimens	No. of positive blood-cultures
1	342	43
2	463	57
3	133	27
4	31	3
5	24	5
6	3	3
7	2	0
8	1	0
9	4	0
10	8	4
11	1	0
12	5	1
14	1	0
15	2	0
16	1	0
20	1	0

Table VI shows that the highest incidence of bacteræmia was in patients with pyorrhœa (21·5%), which fact suggests that infection of the supporting soft tissues is more important than infection of the bone. The fourth group, although very small, amply confirms the very well-known clinical fact that lower wisdom teeth should not be removed while they have a pericoronal infection.

It has been presumed that the apical region of a live tooth, by virtue of its deep position and close contact with tissue fluids, is sterile, the gingival trough alone being infected; and that, if the trough is adequately cauterised before the tooth is removed, and care is taken not to touch the gum on removal, the apex will be found to be sterile. In 69 cases so treated this proved to be

TABLE VI—RELATION OF BACTERÆMIA TO DENTAL CONDITION

Condition	No. of patients	No. of positive blood-cultures
Pyorrhœa	207	44 (*21·25%*)
Acute abscesses	75	10 (*13·33%*)
Caries	469	71 (*15·54%*)
Pericoronitis around lower wisdom teeth	8	2 (*25·00%*)

untrue. No matter how vigorously the gum was cauterised, we always found the apex infected and nearly always with *Strep. viridans*. This is to be expected because the lymphatics normally pass from the gum margin down the periodontal membrane to the apical region. Therefore, even if the gingival trough is sterilised with the cautery, the apical region is still infected. Any organism that gets to the gingival crevice is likely to be taken to the apical region and thence to the lymph-glands or, if extraction disturbs the normal pathway to the lymphatic glands by opening up the blood-vessels, to the blood-stream.

The Operator

The ease with which any operation is done and the time taken to do it depend very much on the technique and experience of the operator, and his general attitude

TABLE VII—BACTERÆMIA IN RELATION TO OPERATOR

Operator	No. of samples of blood	No. of positive blood-cultures
A	361	21 (*6·6%*)
B	99	7 (*7·0%*)
C	65	9 (*13·8%*)
D	12	5
E	73	13 (*17·8%*)
F	27	4 (*14·8%*)
G	25	4 (*16·0%*)
H	333	53 (*15·9%*)
I	7	0
J	111	14 (*12·6%*)
K	85	14 (*16·4%*)
L	6	0
M	1	0
N	18	0

determines the amount of trauma he inflicts on the patient.

In table VII we correlate the incidence of bacteræmia with the operator. Of these, A and H have large comparable series and B a valid series. All the operators had cases of equal difficulty. A had positive blood-cultures in 6·6% of his cases; B in 7·07%; and H in 15·91%. Of the 12 extractions done by students bacteræmia was found in 5 cases, but the number of cases is too small for us to form reliable conclusions. The results obtained by operators C, E, J, and K with much fewer patients shows significantly higher incidence of positive blood-cultures.

TABLE VIII—RELATION OF BACTERÆMIA TO ORIGIN OF BLOOD SAMPLED

Time (min. sec.)	Teeth	Apices		Right ante-cubital vein	Right auricle
Control before	—	—		Sterile	Sterile
35 sec.	3 Incisors	4		*Staph. albus*	Sterile
	1 Canine				
3′ 45″	2 Upper molars	8	12	Sterile	Sterile
	2 Premolars				
5′ 10″	1 Upper molar	3	15	*Strep. viridans*	Sterile
7′ 10″	2 Lower incisors	3	18	Sterile	Sterile
	1 Canine				
8′ 30″	1 Lower canine	3	21	Sterile	Sterile
14′ 10″	5 minutes after last extraction			Sterile	Sterile

Because of the small number of bacteria involved and the large volume of blood in which they must mix before being removed from the arm, it was thought likely that a more efficient way of sampling the blood was by cardiac catheterisation. This was done by Dr. W. Somerville, who took specimens of blood from the right antecubital vein and right auricle simultaneously as the patient's teeth were removed. The patient was a woman, aged 53, with gross caries and periodontal disease, and her teeth were easy to extract. The results of the sampling are shown in table VIII.

Though we would have liked to repeat this investigation on other patients, we felt that this experiment was unjustified in healthy patients.

Conclusions

The technique of the operator is all-important in influencing the degree of bacteræmia induced by dental extraction. Undue rocking or instrumentation of a tooth during extraction is likely to cause a greater number of organisms to be pumped into the blood-stream.

Extractions of upper molar teeth are most likely to cause bacteræmia.

The incidence of bacteræmia following dental extraction is probably less than is sometimes stated. Organisms which are rare in the mouth but common skin commensals should be excluded as being contaminants of the venepuncture.

Cultures of blood taken by cardiac catheter would be of value in determining the true incidence of post-extraction bacteræmia because blood so obtained has not passed the pulmonary bed or the peripheral capillary bed, and there is less risk of organisms being filtered out of the blood-stream before reaching the operator's syringe.

We are indebted to the late Prof. F. R. Selbie, and to the consultant dental surgeons, consultant anæsthetists, and many members of the medical, dental, and nursing staff of the dental outpatient department of the Middlesex Hospital.

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TUBERCULIN-NEGATIVE TUBERCULOSIS PRESENTING AS SARCOIDOSIS

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THE following case throws light on the relation of tuberculosis to sarcoidosis.

Case-report

A stoutly built, healthy-looking man, aged 26, was referred to hospital on March 18, 1955, because for five or six weeks he had had a troublesome cough, with occasionally a little sputum, and had noticed slight dyspnœa on exertion. He had had no previous relevant illnesses.

On examination no abnormality was detected in the respiratory system, there were no palpable glands, and there was no clubbing of the fingers; the temperature, pulse-rate, and respiration-rate were normal. A chest film, however, showed miliary opacities in the lung-fields associated with gross bilateral hilar adenopathy, and the patient was therefore admitted to hospital.

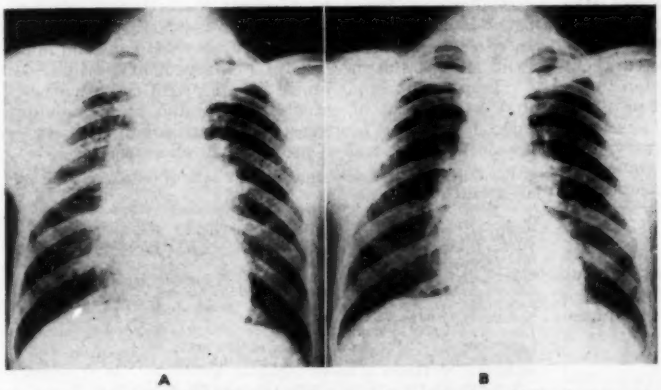
Investigations.—An X-ray of his wife's chest showed no evidence of disease, and a Mantoux test on his 10-month-old baby was negative. Tomography confirmed that the big hilar shadows in the patient's plain chest film were due to enlarged glands, and showed no evidence of cystic change in the lungs. The erythrocyte-sedimentation rate (E.S.R.) (Westergren) was 16 mm. in the first hour. Blood-count: Hb 14 g. per 100 ml.; white cells 7200 per c.mm. (polymorphs 81%, lymphocytes 15%, eosinophils 3%, myelocytes 1%). Total serum-proteins 7·45 g. per 100 ml. (Biuret); albumin 4·45 g. per 100 ml., globulin 3·00 g. per 100 ml.; albumin-globulin ratio 1·48. Mantoux tests were negative with 1 : 1000 dilution O.T. (March 22, 1955) and with 1 : 100 dilution O.T. (March 28). Serological examinations showed no evidence of infection with *Salmonella typhi*, *Salm. paratyphi B*, or *Brucella abortus*; and a Paul-Bunnell test was negative. Radiographs of the small bones of the hands and feet showed no abnormality.

Bronchoscopy (April 5): "The carina was broadened, and there were granulations on the anterior aspect of the right main bronchus just below the carina. The mucosa of the right main bronchus was thickened, and the medial wall of the intermediate bronchus bulged inwards narrowing the lumen by half so that the bronchial tree beyond could not be explored. The lumen of the left main bronchus was narrowed owing to gross mucosal thickening which was also present in the rest of the bronchial tree visualised. The left upper lobe orifice and the orifices of the segmental branches of the left lower lobe were patent, but reduced in calibre owing to mucosal thickening. A biopsy specimen of the medial wall of the intermediate bronchus was taken."

The report (Dr. G. B. S. Roberts) on the biopsy specimen was: "There are two follicles composed of epithelioid cells in the submucosa. Giant cells are present, but no caseation or acid-fast bacilli are seen. The appearances are compatible with sarcoidosis or tuberculosis."

Course.—April 10, 1955, the patient complained of burning pain in the eyes, but conjunctival injection was the only abnormality found. The pain lessened after a week, but it did not entirely disappear. Apart from this the patient felt perfectly well, and he was discharged from hospital on April 21. During his stay he had been apyrexial, the X-ray picture had remained unchanged, and he had gained three pounds in weight. No tubercle bacilli had been seen on direct microscopical examination of six specimens of sputum, and three of these specimens had so far been negative on culture. However, on May 26 it was reported that tubercle bacilli had been grown from sputum put up on culture on April 12.

Second Admission.—The patient was readmitted to hospital on May 27, 1955. His condition was unchanged except that the smarting in the eyes had become worse and had lately been accompanied by photophobia. The conjunctivæ were injected, but again no other abnormality was found; conjunctival biopsy, recommended by Crick et al. (1955) in suspected cases of sarcoidosis, was not performed. The E.S.R. (Westergren) on May 30 was 17 mm. in the first hour. X-ray on June 2 (see figure) showed that the generalised miliary mottling in the lung fields had become somewhat denser, but a Mantoux test with 1 : 1000 dilution O.T. on the same day



A B

Chest films: A, June 2, 1955, showing miliary mottling and enlarged hilar shadows; B, Oct. 13, 1955, showing satisfactory response to administration of antituberculous drugs.

provoked no reaction. Nevertheless, tubercle bacilli were cultured from gastric washings aspirated on June 1 and from sputum obtained on June 6. Moreover, a guineapig inoculated with sputum on June 6 subsequently showed evidence of severe tuberculous infection, and tubercle bacilli were recovered from glands, spleen, and lungs.

Treatment and Progress.—Isoniazid 300 mg. daily and *p*-aminosalicylic acid (P.A.S.) 20 g. daily was commenced on June 10, 1955, and continued for a year. In addition, streptomycin 1 g. daily was given from July 6 to Oct. 13, 1955. A chest film on June 28, 1955, showed that resolution of both the miliary lesions and the enlarged hilar glands had already begun, and this rapid improvement was maintained in serial X-rays until, on Oct. 13, 1955, a chest X-ray showed clear lung-fields and hilar shadows within normal limits (see figure). The conjunctivitis and photophobia disappeared soon after treatment was started. Bronchoscopy was repeated on Sept. 20, 1955: "The larynx was normal. A few small granulations were present on the right lateral wall of the trachea just above carinal level. The carina was knife-edged and mobile. A few small granulations were present in the right main bronchus and a fairly large number in the left main bronchus especially on its posterior wall. There was no evidence of the generalised thickening of the bronchial mucosa or of the inward bulging of the medial wall of the intermediate bronchus noted at the previous examination. A biopsy specimen was taken from the posterior wall of the left main bronchus." This specimen showed "a number of follicles composed of epithelioid cells in the submucosa. There is a moderate degree of fibrosis, and giant cells are large and numerous. No caseation is present. Careful examination has failed to show any tubercle bacilli." Bronchoscopy on Nov. 15, 1955, showed no abnormality in either bronchial tree. Further Mantoux tests with 1 : 1000 dilution O.T. on July 22 and Aug. 18, 1955 were negative; but a test on Sept. 16, 1955, six months after the initial examination, was positive. The patient was discharged well on Nov. 17, 1955.

Owing to difficulty in obtaining antigen a Kveim test was not performed until Jan. 4, 1956. It was negative, and histological examination of a biopsy specimen of skin at the site of the injection eight weeks later showed nothing significant.

Discussion

The features that may be observed in sarcoidosis include a negative tuberculin reaction, miliary opacities in the lung-fields, bilateral enlargement of the hilar glands, uveitis, skin lesions, cystic areas in the small bones of the hands and feet, raised serum-globulin, a tuberculin-neutralising factor in the serum, a positive Kveim test, and a tissue reaction histologically consistent with sarcoidosis. No one of these features is pathognomonic of the condition, and what combination of features is significant is a matter of opinion.

In the present case the persistently negative tuberculin test, the pronounced bilateral hilar-gland enlargement, the miliary opacities in the lung-fields, the conjunctivitis and photophobia, and the biopsy specimen of bronchial mucosa with histological appearances compatible with sarcoidosis would have appeared to put the diagnosis beyond doubt had it not been for the successful culture of tubercle bacilli from the respiratory secretions. Mascher (1951) cultured tubercle bacilli from the respiratory secretions of 6 patients who had negative tuberculin tests; and 2 of these had some other features suggestive of sarcoidosis. The present case closely resembles one previously reported by Lees (1951) in which a man, aged 35, presented with spontaneous pneumothorax, miliary opacities in the lung-fields, and a Mantoux test negative with 1 : 100 dilution O.T.

The collapsed lung re-expanded, but the other features remained unchanged, and, in contrast to the present case, repeated attempts to culture the tubercle bacillus failed. Then after a year the patient complained of malaise, a chest film showed a cavity in the right lower lobe, the sputum contained many tubercle bacilli, and a tuberculin test was strongly positive. It was found also that the blood-serum of this patient during the "sarcoid" phase of the disease neutralised or modified the ability of Old Tuberculin to evoke a typical reaction in the skin of persons known to be hypersensitive, and that this property was lost when open tuberculosis developed.

Wells and Wylie (1949) reported a neutralising factor in the serum of patients with sarcoidosis, and pointed out that it was not a diagnostic finding because it was occasionally present in the serum of patients with other diseases and to a lesser extent even in the serum of some healthy persons.

Material for histological examination was obtained from both the earlier case (Lees 1951) and the present case. In the 1951 case there was no obviously affected superficial tissue, such as enlarged glands, available, so liver biopsy was performed (Scadding and Sherlock 1948). The only abnormality on histological examination was a collection of round cells not characteristic of sarcoidosis or tuberculosis. In the present case a biopsy specimen of affected bronchial mucosa showed a picture compatible with sarcoidosis—follicles composed of epithelioid cells and giant cells with no acid-fast bacilli or caseation. The biopsy specimen was small; and no doubt, as the patient was excreting tubercle bacilli at the time, tissue with appearances typical of tuberculosis might well have been obtained. This experience illustrates the point that tuberculous infection may produce the histological changes as well as other features of sarcoidosis. The radiological and bronchoscopic evidence of rapid shrinkage of the enlarged hilar glands in response to treatment is noteworthy; for this suggests that the tissue reaction had been mainly proliferative, not caseous.

Some workers maintain that sarcoidosis and tuberculosis are different entities, but the two cases discussed above suggest that a basis for distinction may be very difficult to find. On the other hand, the proposition that sarcoidosis is merely a form of tuberculosis is equally difficult to support, for exposure to beryllium may lead to a granulomatosis with lesions histologically indistinguishable from sarcoidosis (Hardy and Tabershaw 1946); and other agents, as yet unidentified, may do likewise. Scadding (1950) considers that sarcoidosis is a reaction of the reticulo-endothelial system to various agents, two known—the tubercle bacillus and beryllium—and one or more as yet unidentified; and this hypothesis seems to accord best with the evidence. If this view is accepted the clinician faces two problems: (1) to separate the sarcoid syndrome from diseases which may resemble it (and here histological examination of excised tissue may help); and (2) to identify, if possible, the causal agent.

In beryllium sarcoidosis it seems that this second step may already be taken, for a skin patch test with beryllium salts will provoke dermatitis if the syndrome is due to beryllium, but not if it is due to some other agent (DeNardi et al. 1953, Van Ordstrand 1954, Sneddon 1955). Sneddon (1955) reported also that a patch test in a case of beryllium sarcoidosis caused a delayed sarcoid reaction in the dermis. This test is, of course, necessary only when the patient may have been exposed at some time to a beryllium hazard, and in most cases it is a question of whether the syndrome is due to tuberculosis or to an unknown agent.

In the present case a Kveim test was done only after the disorder had responded completely to therapy, but in the earlier case of tuberculous sarcoidosis (Lees 1951), a negative result was obtained during the sarcoid phase of the disease and it was therefore suggested that a positive Kveim test might indicate a causal agent other than tuberculosis. There appears, however, to be no real evidence that this is so, and even if it were so it would be difficult to adduce convincing proof. The test consists in the intradermal injection of a saline suspension of sarcoid gland tissue, and if positive a nodule of sarcoid tissue appears in a few weeks and persists for months. Kveim (1941) reported the test positive in 12 out of 13 cases of sarcoidosis and had no false positives in controls, and James and Thomson (1955) considered that subsequent work, including their own, tended to confirm the diagnostic specificity which Kveim's results suggested, for although the test might be negative in cases of sarcoidosis in which the disease had become inactive (Nelson 1948, 1949) false positives were rare. On the other hand, Sones et al. (1955) concluded that the test was not specific enough to be of diagnostic value. Even assuming, however, that this test were specific for the sarcoid syndrome, it would not follow, as has often been inferred, that because the test differentiated sarcoidosis from ordinary tuberculosis it would necessarily differentiate tuberculous sarcoidosis from sarcoidosis due to other agents. Indeed, if Hoyle et al. (1955) are correct in their view that most cases of sarcoidosis in this country have a tuberculous basis, the uniformly positive results obtained by James and Thomson (1955) in their 12 clinically active cases of sarcoidosis would suggest the opposite. Moreover, as Nelson (1948, 1949) points out, a positive result is presumably not a response to a specific causal agent (as is the case with a positive beryllium patch test), for not only extracts of sarcoid glands but also an injection of B.C.G. (Lemming 1942), living or dead tubercle bacilli (Warfvinge 1943, 1945), or extracts of normal splenic tissue (Nelson 1948, 1949) may evoke a similar response. Whatever the result of future investigations may be, it would seem unwise at present to assume that a positive Kveim test excludes a tuberculous ætiology.

In 12 of 30 cases of sarcoidosis, Hoyle et al. (1955) reported improvement definitely related to streptomycin and P.A.S. therapy; but whereas the response was comparable to that in chronic tuberculosis in 11 out of 15 cases of less than two years' duration, benefit was observed in only 1 out of 9 cases of more than two years' duration. They considered that the poor results in long-standing cases were due to the occurrence of fibrosis before treatment had been started. To forestall this development, and especially to avert serious complications such as tuberculous meningitis, it would seem desirable to try the effect of antituberculous drugs in all cases of sarcoidosis without undue delay.

Summary

A young man presented with features of sarcoidosis—bilateral hilar adenopathy, miliary opacities in the lung-fields, repeated negative tuberculin tests, eye symptoms, good general health, and histological features of sarcoidosis on bronchial biopsy. Nevertheless, virulent tubercle bacilli were cultured from respiratory secretions. In response to antituberculous drug treatment the lung-fields cleared and the glandular enlargement disappeared.

These observations are in keeping with the hypothesis that some cases of sarcoidosis are due to tuberculous infection; and it is suggested that antituberculous drugs should be administered promptly in all cases.

I should like to thank Prof. N. Danbolt, of Oslo, for a supply of Kveim antigen.

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ARGENTAFFIN CARCINOMA OF THE ILEUM WITH CYANOSIS

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SINCE Biörck et al. (1952) drew attention to a syndrome in which metastasising argentaffin carcinoma of the alimentary tract is associated with flushing attacks, cyanosis, dyspnœa, diarrhœa, and pulmonary stenosis, several examples of the disorder have been described. It is now clear that many of the features of the syndrome are due to secretion of 5-hydroxytryptamine by the tumour cells. The patient described below died before the condition was generally recognised in this country. However, the case is published because the symptoms which may be due to the secretion of 5-hydroxytryptamine became worse after radiotherapeutic irradiation of the abdominal metastases.

Case-report

A man, aged 69, attended the George Eliot Hospital, Nuneaton, in May, 1953, with twelve months' history of intermittent diarrhœa. Every few days he had an attack which lasted for about twenty-four hours and during which about five fluid motions were passed. No blood or mucus was observed in the motions. He also complained of backache and swelling of the legs of six weeks' duration and had been somewhat short of breath on exertion for about a year.

On examination his liver was enlarged and hard, with palpable nodules. Rectal examination revealed considerable nodular induration in the pelvis. A barium enema showed narrowing of a segment of pelvic colon due to extrinsic causes. A test for occult blood in the fæces was negative. Other investigations threw no light on the case. The patient was thought to have advanced malignant disease, with deposits in the liver and pelvis, the site of the primary focus being uncertain. He was discharged home and subsequently seen from time to time as an outpatient.

In January, 1954, he was feeling fairly well apart from occasional bouts of diarrhœa. His weight remained almost stationary at 10 st. 4½ lb. compared with 10 st. 7½ lb. on his first attendance. The slow progress of the disorder was so striking that for the first time the possibility of an argentaffin tumour was considered. A biopsy of one of the nodules in the liver was therefore done, and Dr. E. N. Trounson reported that "the sections confirm the presence of metastatic carcinoma. This is almost certainly of argentaffin type."

In June, 1954, the patient's general condition remained unchanged. His liver felt a little larger. It was decided to try the effect of radiotherapy on the abdominal metastases. Accordingly he was readmitted to hospital, and daily irradiation was given to his whole trunk from the front and from the back in the form of a "bath," the spleen being protected. After three weeks the treatment was interrupted because his general condition, which had remained good for so long, was now much worse, with severe cyanosis of a particularly livid character; dyspnœa; generalised œdema, which was most severe in the legs, genitals, and back; and gross ascites. The œdema was reduced somewhat by mercurial diuretics and repeated paracenteses. Although the patient now looked very ill he continued to survive in a remarkable manner until he died on Sept. 30, 1954, three months after the start of radiotherapy and sixteen months after his first attendance at hospital.

Necropsy Findings (Dr. G. B. Doyle)

The peritoneal cavity contained several pints of straw-coloured fluid. There was a large nodule of malignant growth in the mesentery of the ileum about 1 ft. from the cæcum. The adjoining ileum had a flattened area of new growth in its mucosa. The rest of the mesentery contained extensive deposits of malignant growth. The appendix appeared normal. The extraperitoneal tissues were infiltrated with new growth, and this extended to the pelvic brim, which was narrowed by tumour tissue. The liver contained multiple secondary deposits, chiefly in the subcapsular zone. The kidneys were very congested; in the capsule of the right kidney was a secondary malignant deposit. The bladder also had a small nodule of new growth in its wall.

There was severe pulmonary congestion, with œdema and a small area of collapse near the left hilum. The pericardium was completely adherent over the heart and was calcified over the right ventricle. The myocardium was fibrosed and flabby. The aortic valve was calcified and slightly stenosed. The coronary vessels were atheromatous but patent. On the left side of the brain was a small area of softening in the basal ganglia, which had become cystic.

Comment

There is little doubt that many of the characteristic features of this interesting syndrome are due to the secretion of 5-hydroxytryptamine by the metastases. A large bulk of tissue is necessary to produce these effects, and massive hepatic metastases have been present in all the published cases. Improvement has followed removal of a part of the tumour mass (Thorson et al. 1954). 5-Hydroxytryptamine is inactivated in the pulmonary vascular bed by mono-amine oxidase; this explains why the cardiac changes are confined to the right side of the heart. 5-Hydroxytryptamine is excreted in the urine as 5-hydroxyindolacetic acid, and the estimation of urinary 5-hydroxyindolacetic acid is the best biochemical test for argentaffinoma.

Goble et al. (1955) obtained striking but temporary clinical improvement by intravenous injection of 80 mC of colloidal radioactive gold (^{198}Au), which is concentrated in the liver. This was accompanied by a fall in the level of serum-hydroxytryptamine. No other report has been published of the effect of irradiation on the syndrome. In the present case irradiation of the abdominal metastases was followed by an immediate and severe deterioration in the patient's condition. This was the more striking because his condition had remained stationary for so long—a characteristic feature of argentaffin carcinoma and one which led to the diagnosis in the present case. In the absence of biochemical data one can only speculate about the mechanism responsible for the clinical change.

Summary

An example of argentaffin carcinoma of the small bowel associated with cyanosis, dyspnœa, diarrhœa and œdema is reported.

Deep X-ray treatment of the abdominal metastases was followed by aggravation of these symptoms.

We are indebted to Dr. E. N. Trounson for the histological examination, Dr. G. B. Doyle for the necropsy report, and Dr. K. Sicher for arranging the X-ray treatment.

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TRICHLOROETHYLENE POISONING

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TRICHLOROETHYLENE is very commonly used in industry to dissolve grease. Poisoning may be either accidental or intentional, as in suicidal attempts or addiction (O'Connor 1954).

Many reports of toxic effects from the inhalation of trichloroethylene have been published: Stüber (1931) recorded 241 cases with 25 deaths, and von Oettingen (1937) collected a further 15 cases. Accounts of poisoning by ingestion, however, are uncommon.

Kleinfeld and Tabershaw (1954) described 1 case with a fatal outcome; at necropsy severe lower-nephron necrosis, centrilobular necrosis of the liver, and acute pancreatitis were found. Unfortunately the report contains no indication of the amount ingested. Stephens (1945) reported 2 cases in which about ½ oz. of trichloroethylene was taken in mistake for cough medicine: both patients were comatose for some hours despite treatment with emetics. A girl who took trichloroethylene was dazed, had numbness of the feet and hands, and was incontinent (Naish 1945).

We report here a further case of poisoning by ingestion.

Case-report

A man, aged 22, was admitted to hospital deeply comatose. According to his father, about 1½ hours previously he had drunk some cleaning-fluid obtained from a clothing factory where he had been employed. He behaved normally for a minute or two, but then stood up, staggered across the room, fell on the floor, and immediately became unconscious.

On examination his breath smelt strongly of trichloroethylene. He was pale and sweating, and his jaws were tightly clenched. There was no response to painful stimuli, his limbs were flaccid, and his tendon-reflexes were present but difficult to elicit. The pupils were eccentric and contracted, and reacted only slightly to light. The plantar reflexes were equivocal. His pulse was regular at 68 per min., but there were short intermittent periods when the heart's action became very rapid while still remaining regular. Respirations were gasping at a rate of 60 per min.

Treatment and Progress.—The patient's stomach was washed out, and an airway was inserted. On admission 50 ml. of 50% glucose was given intravenously, and two further injections of 200 ml. of 50% glucose were given four and twelve hours later. Oxygen by B.L.B. mask was also given. The day following admission a semicomatose state persisted, and hourly glucose feeds were given through an œsophageal tube. The limbs were moved in response to painful stimuli. The respirations and pulse-rates were normal. Next day (36 hours after admission) simple commands were obeyed, but the patient was completely disoriented, slept for long periods, and passed large amounts of urine incontinently. There was no glycosuria, and no burning of the mouth or of the pharynx was seen. On the fourth day the patient was rational, oriented, and able to give a clear account of the events preceding the ingestion of the trichloroethylene, including the information that the 5-oz. bottle his father had brought to hospital had been full (there was 10 ml. left in the bottle when it was received).

Previous history included admission to another hospital in 1952 after accidentally ingesting an unknown quantity of the

same fluid. At that time, complaints were of drowsiness and light-headedness, with pulse-rate 70, pulse regular, respiratory system and pupils normal. Treatment was by stomach washouts, glucose and calcium gluconate, and nikethamide. Liver-function tests on discharge at that time were normal.

Investigations.—Electrocardiography shortly after admission showed prolongation of the P.R. interval to 0·26 sec. but no other abnormality, the rapid heart action having ceased spontaneously before the tracing was taken. Ten days later the P.R. interval was 0·18 sec. The day after admission liver-function tests showed serum-albumin 5·0 g. per 100 ml., serum-globulin 2·1 g. per 100 ml., serum-bilirubin 0·8 mg. per 100 ml., alkaline phosphatase 10·8 King-Armstrong units, and thymol turbidity 1 unit. 6 days later estimations were again normal.

The urine contained no protein at any time during his stay in hospital. A chest X ray was normal. There was no clinical evidence of residual damage to the cranial nerves.

Comments

This case is of interest in that there were two episodes of poisoning by the same agent. The liver-function tests showed no gross abnormality, and this is in agreement with most workers, who have shown that trichloroethylene, unlike chloroform, carbon tetrachloride, and tetrachlorethane, to which it is chemically related, is not very toxic to the liver. Liver damage in industry has, however, been reported in cases of poisoning by inhalation (Willcox 1934). Cardiac arrhythmia is sometimes observed when trichloroethylene is used as an anæsthetic, and this patient showed definite but transient prolongation of the P.R. interval in the initial electrocardiogram and intermittent periods of rapid heart action.

It is apparent that, with adequate therapy, complete recovery from trichloroethylene poisoning may take place despite long-continued coma.

Our thanks are due to Dr. J. F. Pantridge for his advice and permission to publish.

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SEVERE DIPHTHERIA IN AN INOCULATED PATIENT

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THE following case is reported as an example of severe diphtheria in an "immunised" boy, who recovered in spite of spontaneous hæmorrhages.

Case-report

A boy, aged 4 years 8 months, developed sore throat, cough, malaise, anorexia, and restlessness on Feb. 27, 1956. He was treated for follicular tonsillitis with sulphonamides but gradually became more restless and delirious and developed a yellow nasal discharge and difficulty in swallowing solids. On March 3 he was moved to a hospital with a temperature of 99·8°F and pulse-rate 116. He looked ill and had enlarged cervical lymph-glands and severe tonsillitis, with a greyish-white membrane covering his fauces and spreading on to his soft palate and uvula. During examination spontaneous hæmorrhages developed on the right side of his face. He was given antidiphtheritic serum (A.D.S.) 10,000 units intravenously and 20,000 units intramuscularly, and penicillin 1,000,000 units, followed by 500,000 units four-hourly. No improvement being noted in the following forty-eight hours, he was transferred to this unit on March 5.

Past History.—He had been fully inoculated against diphtheria in 1952, having received 0·5 ml. of alum-precipitated toxoid (A.P.T.) on July 24 and 0·5 ml. of A.P.T. on Aug. 22 of that year.

On admission he was listless and obviously toxic, with temperature 97°F, pulse-rate 108, and respirations 30 a minute. He had ecchymoses on his face, thighs, and ankles, and fairly extensive bilateral cervical periadenitis. In his throat was a hæmorrhagic necrotic blackish-yellow membrane extending across the soft palate and uvula from one tonsil to the other, with general reddening of the fauces. He had tachycardia, a systolic murmur localised to the apex, and blood-pressure 105/50 mm. Hg. His face was puffy, and his legs were slightly œdematous. No other abnormality was detected. A Hess test was negative.

Treatment.—He was given A.D.S. 20,000 units intramuscularly and penicillin 500,000 units six-hourly.

Investigations.—A blood-count showed 11,500 leucocytes per c.mm. (polymorphs 70%, lymphocytes 25%, monocytes 5%) and 93,000 platelets per c.mm. The hæmoglobin was 12·4 g. per 100 ml. (84%). The urine was turbid and acid, and contained albumin, epithelial cells, and scanty erythrocytes; no organisms were seen, and no bile pigments detected. A Paul-Bunnell screening test was negative; a throat-swab smear was negative for *Corynebacterium diphtheriæ*; and a blood-culture remained negative after twenty-one days.

Further Treatment and Course.—The patient showed no improvement, and on March 9 A.D.S. 80,000 units was given (40,000 units intravenously). On March 10 news was received that *C. diphtheriæ gravis* had been identified from culture of the throat swab, and that the virulence test was positive.

Subsequent Course.—The temperature ranged from 97·0° to 98·4°F. The tachycardia present on admission gradually increased, the blood-pressure fell to 90/50 mm. Hg, the apex-beat became imperceptible, and the pulse almost so. The systolic murmur became audible over the whole precordium, being heard best at the pulmonary area. Electrocardiography showed general low voltage, with flattened T waves in the standard leads and inverted T waves in V_{3-6}. After six weeks the signs of myocarditis had subsided, the blood-pressure was 120/80 mm. Hg, and the electrocardiogram normal. The systolic murmur persisted. The faucial membrane gradually became smaller, cleaner, and more typical, with red crenated borders, and disappeared completely by the eighteenth day of illness. The output of urine was low for the first few days. The œdema persisted for about two weeks, and the albuminuria for six weeks. Nervous complications developed later than usual (a good prognostic sign), palatal paralysis developing in the sixth week of illness. In the seventh week the abdominal, knee, and ankle reflexes were lost, and both lateral rectus muscles of the eyeballs were paralysed. All these lesions had entirely disappeared by the ninth week of illness.

Discussion

The present case is of interest because, although the patient had been fully inoculated against diphtheria, he contracted a severe form of diphtheria with extensive membrane, severe toxæmia, spontaneous hæmorrhages, myocarditis, and early severe albuminuria. The clinical course was typical, and ended in complete recovery.

The incidence of diphtheria in fully inoculated patients is far higher than appears to be generally realised, though it is definitely and constantly lower than in non-inoculated patients, and severe attacks or deaths in the inoculated group are very exceptional. Bloss (1955) reports that, in 1954, of 100 patients aged 14 or less, 39 had been inoculated, all of whom recovered. Gibbard et al. (1945) describe 94 cases, in which 23 of the patients had been fully inoculated; there were 5 deaths and 14 severe cases, but none of the 23 fully inoculated patients died or was severely ill. Gibbons (1945) found 250 cases of diphtheria (24%) among Schick-negative reactors in 1038 proved cases studied over a period of two and a half years. Lycett and George (1953) reported 108 confirmed cases, in which only 7 (12%) of the patients had been fully inoculated: of 22 severe cases, only 7 had any history of inoculation at all, and of 6 patients who died 5 had never been inoculated and the 6th, a girl aged 8 years, had only a doubtful history of inoculation in

infancy. The use and results of diphtheria immunisation are extensively discussed by Greenberg (1955).

Another unusual feature in the present case is that diphtheria attacked an inoculated patient sporadically when the incidence of diphtheria in England is so very low. The corrected notifications in England and Wales were 41,272 for 1945–49 and 2468 for 1950–54. In the latter period the notifications for each year were as follows: 980 in 1950, 699 in 1951, 375 in 1952, 267 in 1953, and 167 in 1954. In 1940, the year when the national immunisation campaign opened, the deaths (2480) exceeded the notifications (2468) for 1950–54.

Summary

A case is described of severe hæmorrhagic diphtheria with recovery in an inoculated boy.

Diphtheria is relatively common in the inoculated, but severe attacks are uncommon.

I thank Dr. G. D. W. McKendrick for permission to publish and for valuable advice in the preparation of this paper; and Dr. F. R. O'Shiel, medical officer of health for Stepney, for supplying details of the patient's inoculations.

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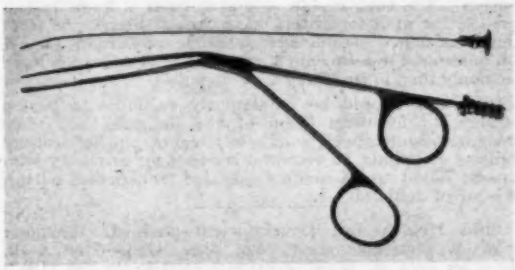
New Inventions

A MASTOIDECTOMY FORCEPS

THE forceps illustrated here allows the assistant at a mastoidectomy operation to apply suction and to remove bone chips with a single instrument. This leaves his other hand free for duties such as guarding the facial nerve. Size has been kept to a minimum because of the restricted space in operations on the ear. One blade, with its corresponding handle, is tubular for connection to the suction bottle. The opening on this blade is about half the diameter of the bore, so that chips which pass through are unlikely to cause obstruction. To allow a stylet to be passed, only a small bend is possible in the arm carrying the sucker. This has made necessary the somewhat unorthodox arrangement of the handles, so that they do not block the operator's line of vision.

The instrument is held to one side of the incision, with its blades closed while the surgeon is working, and



behaves as a normal sucker. This suction continues while the instrument is being used as a forceps, and exposes the chips, which are then picked out. Pieces too small to grasp easily will adhere to the end of the sucker and can be removed in this way.

Although designed primarily for operations on the ear, the forceps can be used in other situations where small objects have to be picked up in the presence of blood or pus. To provide a wider range of usefulness the blades are longer than is necessary for the ear. For example, the removal of a nasal foreign body may be complicated by bleeding, which is troublesome when there is insufficient room in the nose for both a sucker and a forceps at the same time.

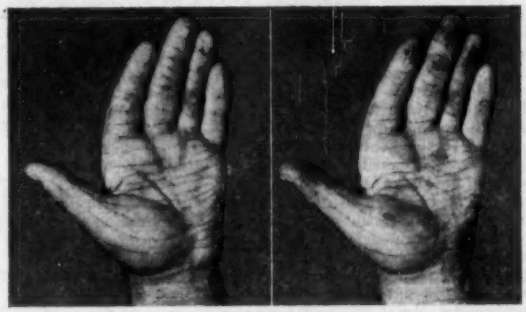
The instrument was made by Messrs. Willen Bros. Ltd., 44, New Cavendish Street, London, W.1.

St. Mary's Hospital, London — ROBERT LAKIN M.B. Lond.

INSTRUMENT FOR MARKING AREAS OF SKIN OF LOW ELECTRICAL RESISTANCE

THE mapping of sweating and non-sweating areas of skin by measuring the electrical resistance at points throughout a region, and the subsequent recording of the values on specially prepared charts,[1] is normally a lengthy task.

To help the operator to decide whether any area is fully or partially sympathectomised, McPherson and Malcolm[2] have designed an instrument which will not only indicate the resistance, but will also operate a signal, such as a



A B

Left hand four months after suture of left ulnar nerve in mid-forearm. A, area of anhidrosis on little finger and distal portion of ulnar side of hand clearly demarcated by absence of ink lines. B, chinizarin powder dusted on top of hand shown in A. In neither case was hypohidrosis induced by reflex heating.

light, if the resistance is above or below any predetermined value.

The principle of this device has been applied to an instrument for automatically marking areas of low skin resistance. The passage of the exploring electrode over such an area results in the energising of a solenoid in the handle of the electrode, by the operation of a circuit similar to that of McPherson and Malcolm. The solenoid brings the tip of a ball-point-pen refill into contact with the skin through a small hole in the centre of the electrode. The electrode therefore writes a continuous line on skin of low electrical resistance but will not write over areas of high resistance because the circuit will not then operate. The limiting value of resistance above which the pen will not write can be adjusted by the operator.

To obtain a sharp line of demarcation the electrode should be drawn over the skin from a suspected dry area towards the sweating area. If the pen does not write clearly, it may be necessary to wipe any grease off the skin.

The effect produced on the skin is similar to that obtained when chinizarin[3] is used, without the inconvenience to the patient and without the necessity for producing profuse sweating. After photography, the marks can easily be removed by applying spirit.

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Reviews of Books

The Pathology and Surgery of the Veins of the Lower Limb

HAROLD DODD, CH.M., F.R.C.S., surgeon to St. Mary's Hospital (London) Group; FRANK B. COCKETT, M.S., F.R.C.S., surgeon to St. Thomas's Hospital, London. Edinburgh: E. & S. Livingstone. 1956. Pp. 462. 65*s*.

THE diagnosis and treatment of venous lesions has been greatly handicapped in the past by incomplete understanding of the normal and abnormal venous anatomy and function. Many years ago Turner Warwick elegantly demonstrated the direction of the flow in the venous perforators of the leg; and his findings have been greatly expanded by further anatomical investigations, of which Cockett's work is well known, and by the development of phlebography and venous-pressure recording. Such information has provided the modern surgeon with far greater insight into the physiopathology of venous lesions and enabled treatment to be based on more rational grounds.

This excellent monograph reviews with erudition and balance the important developments of the past decade.

The emphasis and tone of the writing are largely derived from the authors' wide experience and original contributions. The detailed anatomy along with the important variations of the leg veins are clearly described and amply illustrated; and the functional efficiency and physiology of the limb blood-flow are reserved for a separate chapter. All of the venous disorders which the surgeon is likely to meet are covered in considerable detail. The operative techniques are well presented, and—perhaps even more important—there are full descriptions of details, such as types and application of bandages, the nature of the local application, and the pressure crêpe, which often make the difference between good and bad surgery. In addition to varicose veins the differential diagnosis of leg ulceration, embolism, special methods of investigation such as phlebography and venous-pressure recordings, the post-thrombotic syndrome, and superficial thrombophlebitis are dealt with fully. Dr. S. T. Anning contributes a historical survey.

This book should interest and instruct all concerned with venous surgery of the lower limb.

New Pathways in Cellular Metabolism

GORDON ROY CAMERON, M.B., D.SC., F.R.C.P., F.R.S., director of the Graham Research Laboratories and professor of morbid anatomy at University College Hospital Medical School, University of London. London: Edward Arnold. 1956. Pp. 90. 16*s*.

CURRENT views on the structural and dynamic state of the cell, as revealed by the application of modern biochemical, biophysical, and cytochemical methods, are first succinctly outlined; and then an attempt is made to describe certain aspects of pathological cellular behaviour in these terms. Based on lectures given by the author and on research proceeding in his laboratory, the book is pleasantly and clearly written and well illustrated by numerous photographs, including electron micrographs and diagrams. It provides a very readable general introduction and guide, with well-selected literature references, to what the author rightly describes as exciting new pathways in the exploration of cellular pathology.

Androgens

Biochemistry, Physiology and Clinical Significance. RALPH I. DORFMAN, PH.D., associate director of laboratories, Worcester Foundation for Experimental Biology and Research, Mass.; REGINALD A. SHIPLEY, M.D., director, radioisotope unit, Veterans Administration Hospital, Parma, Ohio. New York: John Wiley. London: Chapman & Hall. 1956. Pp. 590. 108*s*.

THIS monograph is a comprehensive survey of the androgenic hormones and of the state of maleness.

The book begins with an interesting account of the historical background. The second section deals with the source of androgens from the gonads and the adrenal cortex and with their chemical structure and metabolism. The third section deals with the physiological actions of androgens not only on sexual anatomy and function, but also on other endocrine and non-endocrine structures, on metabolic and enzymatic processes, and on human and animal behaviour. The fourth section is concerned with clinical aspects. One of the two appendices comprises a list of the structural formulæ and systematic names of 225 androgenic and related compounds, each of which is given a serial number to which reference is made on every mention of the compound in the text. The other appendix contains detailed accounts of the methods of bio-assay of androgens and estimation of 17-ketosteroids. Each chapter contains an extensive bibliography, and there are abundant tables, diagrams, charts, and photographs.

This work should be invaluable to anyone interested in the scientific or clinical aspects of its subject.

Anæsthesia for Obstetrics

ROBERT A. HINGSON, professor of anesthesia, Western Reserve University; LOUIS M. HELLMAN, professor of obstetrics and gynecology, State University of New York. Philadelphia: J. B. Lippincott. London: Pitman Medical Publishing Co. 1956. Pp. 344. £8.

THE specialties of obstetrics and anæsthesia are so closely linked in certain aspects of the management of parturient women that, as the authors of this work point out, "there comes a time when each reaches such a stage of complexity that a definitive text on problems and relationship of each to the other becomes obligatory." Nevertheless "nature can perform the process involved quite safely and frequently unaided . . . the sine qua non ever should be safety for mother and child." These statements largely sum up the approach of Dr. Hingson and Dr. Hellman.

This work is up to date and provocative. Although the techniques that have stood the test of time—particularly local analgesia—are generally recommended, methods which so far have been received less favourably are also given due weight. The description of cyclopropane and oxygen delivered from a specially designed portable miniature machine, and the unbiased account of trichlorethylene, are especially valuable features.

This book reveals clearly the advantages of close understanding between obstetrician and anæsthetist.

Incidents et accidents de la transfusion sanguine

Prevention et traitement. R. ANDRÉ, B. DREYFUS, CH. SALMON, Centre Régional de Transfusion Sanguine de Paris. Paris: Masson. 1956. Pp. 125. Fr. 1200.

THIS book reviews the world literature in the light of the experience of the Transfusion Centre of Paris. It contains nothing new to experts, but it is convenient to have at hand so complete a summary of reported work commented on by so experienced a team.

The principal divisions are: hæmolytic reactions and immunisation, which account for nearly half the book; intolerance to plasma; febrile reactions; disease transmitted by transfusion (with a very thorough review of post-transfusion hepatitis); hæmochromatosis; and a 20-page technical supplement. The book reveals several differences from English practice, the most important being that in France the term "universal donor" is still used and apparently group-O blood is administered to recipients of group A, B, or AB much more commonly than in Britain.

This book should be particularly valuable to junior workers, to forewarn them of the dangers they may encounter, and is well worth buying for the laboratory library. It should be required reading for anybody who expects blood to be made ready for transfusion within an hour of demand.

Child Health and Development (2nd ed. London: J. & A. Churchill. 1956. Pp. 525. 42*s*.).—This book, edited by Prof. R. W. B. Ellis, was good in its first (1947) edition. It is now even better. As before, it is divided into two parts—one on development of the child, and the other on various social agencies which directly help the child. Appendices give a synopsis of legislation and a summary of normal biological values. Sixteen authors contribute; Professor Ellis writes 5 of the 23 chapters, as well as the excellent introduction. Undergraduates should be introduced to this as a source book; doctors working for entry to pædiatric practice should certainly read it; and general practitioners, public-health doctors, and pædiatricians would get enjoyment and benefit from it.

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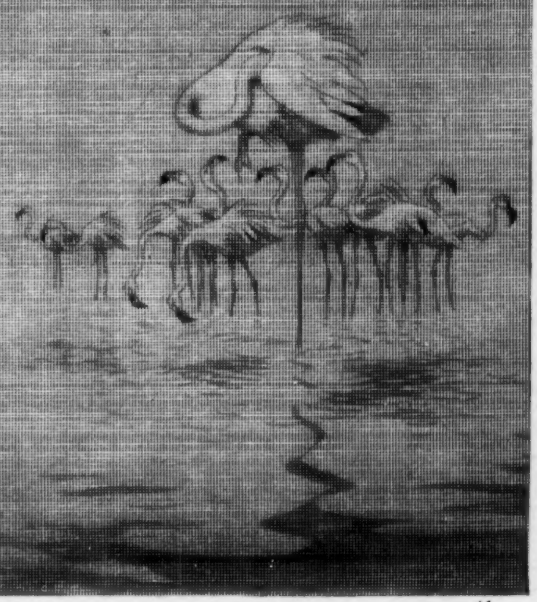

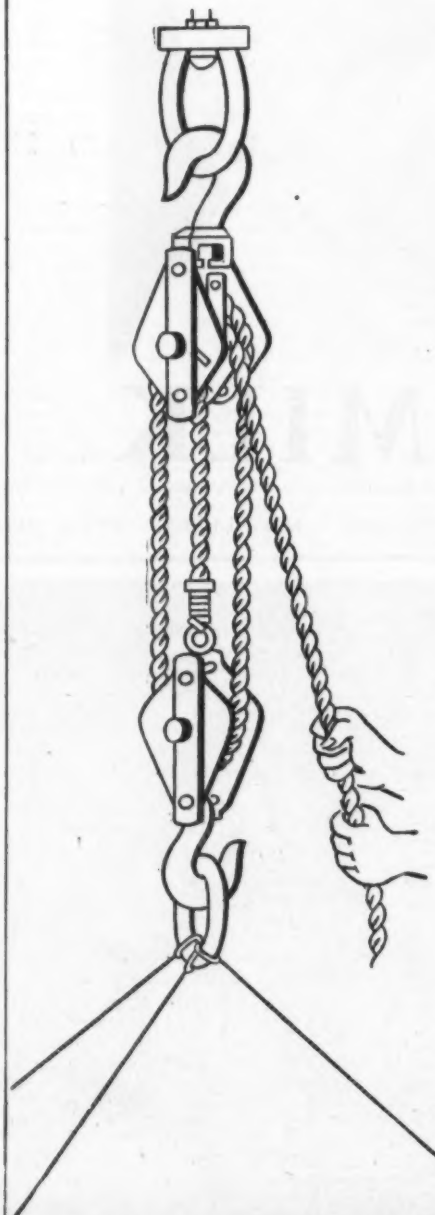

Avoiding Resistant Strains...

Particular emphasis has been given to the use of combined chemotherapy in the treatment of infections, and it has been realised that there is considerable merit in the judicious combination of antibiotics and sulphonamides in the prevention of bacterial resistance.

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Classifications of Nephritis

THERE has never been a shortage of classifications of nephritis. Over the years they have vied with each other in complexity and obscurity. When ELLIS [1] prepared a simple scheme to include most types of acquired inflammatory renal disease it was accepted with relief and soon passed into the British literature and clinical teaching. But it has never received wide recognition in other countries, and it is sometimes forgotten that ELLIS declared that his lectures should be regarded as a preliminary communication. Further, the group of miscellaneous conditions not included under types I or II nephritis contained chronic pyelonephritis, probably the commonest of all kidney diseases, and acute focal nephritis,[2] an entity whose existence independent of acute glomerulonephritis is at least doubtful.[3]

As type-I nephritis ELLIS described the clinical syndrome of acute glomerulonephritis and its sequelæ. He acknowledged the frequent antecedent infection, outlined the main features of the disease and its prognosis, and noted that in a small group the kidneys failed many years later. He also held that this clinical entity had its counterpart in a specific histological change in the kidney, the essential features being the formation of epithelial crescents in the glomeruli and fibrinoid necrosis in the renal arterioles. Type-II nephritis was much less specific. It could appear at any age, and its onset was insidious and unheralded by infection. Hæmaturia was slight or absent, but œdema was generalised, persistent, or recurrent. Recovery was rare, secondary infection common, and death was usually due to uræmia or hypertension. And here too there was a specific histological picture —a particular distribution of hyaline material in the lobules of the glomerular tuft, resembling amyloidosis, but without its staining properties. It follows that the essential clinical difference between type-II and chronic type-I nephritis appearing after a latent interval is the occurrence of a previous attack of acute glomerulonephritis in the type-I disease or an earlier phase of nephritic œdema and albuminuria in type II. Yet such an attack might pass undiagnosed during an epidemic of streptococcal infections (and indeed has been known to do so [4 5]) or a transient slight œdema may escape recognition. Thus, on theoretical grounds the classification is open to question. Even so, if it has stood the test of time for the past fourteen years, these objections could well be discounted. If it can be shown that the classification is in accord with the facts, clinical or histological, or both, then its value is established and contention is at an end.

There have been three critical appraisals of the classification since 1942, and none of them gives unqualified support to ELLIS's views. DAVSON and PLATT [6] concluded that the classification fits the observed clinical facts; but both ENTICKNAP and JOINER [7] and CLARK [8] found some cases which could not be adequately classified clinically as either type I or type II. In a well-documented account of 265 consecutive cases of nephritis admitted to the Royal Aberdeen Hospital for Sick Children between 1934 and 1952, CLARK found 26 such cases, and he came to favour a return to a more clinically descriptive nomenclature. If ELLIS's classification does not entirely conform with the observed clinical facts, then its validity must depend upon his second point—that each type is associated with a specific histological change in the kidneys. DAVSON and PLATT supported this view, though they acknowledged that some cases were classified only after mutual persuasion by clinician and pathologist. On the other hand, they also found evidence of both type-I and type-II lesions in some kidneys that they examined, and they reserved judgment as to whether the diseases really had separate ætiologies. ENTICKNAP and JOINER found lesions of both types in the kidneys from cases grouped clinically as type-II nephritis, and they concluded that this was not a single pathological entity. More recently, serial renal biopsies have shown that epithelial crescents may appear after membranous change [9]; and it seems therefore that these changes cannot be accepted as specific or mutually exclusive.

It is hard to escape the conclusion that there is no certain histological difference between type I and type II, and that there are no very good reasons for retaining ELLIS's classification, unless the argument is that, although imperfect, it is the best yet available. Certainly, we know of no other simple classification which includes all clinical syndromes of renal failure and all possible histological changes. But is this to be expected? The kidney is a crossroads where several diseases meet. Their effects depend upon their severity and extent, and whether glomeruli or tubules are the more severely damaged. In general, the conditions can be regarded either as primary diseases of the kidney, like acute glomerulonephritis following infection with β-hæmolytic streptococci, or as diseases in which the kidney is secondarily damaged, either functionally, as in congestive heart-failure, or structurally, as in disseminated lupus erythematosus.[10] Moreover, it is often impossible to go beyond "terminal renal failure" as a clinical diagnosis or "contracted kidney" as a pathological one. It may be that further study of the immunity reactions involved may clarify matters. Thus, the application of fluorescent microscopy to experimental nephritis has shown that the antigen-antibody reaction is sometimes concentrated on the glomerular basement membranes.[11]

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The particular method used in this work produced histological changes suggestive of type II. On the other hand, the fluorescence technique has also demonstrated a different kind of antigen reacting with antibody in the cells of the glomeruli [12]; and the histological picture here is that of type-II nephritis. But until we know more of the relevance of these observations to human disease, there is much to be said for returning to terms of clinical description, such as acute hæmorrhagic nephritis and subacute œdematous nephritis, as CLARK suggests; they would be used, however, without implying any specific underlying renal lesion. The lesion can often be identified after carefully weighing all the facts; but diseases first seen late in their course will continue to defy precise classification.

Thyroid Nodules and Nodular Thyroids

THERE is still no certain answer to the question how best to deal with the commonest of all thyroid lesions—the simple nodular goitre. PERLMUTTER and SLATER [13] mention some American authorities who advise the immediate removal of all or most nodular goitres because of danger of carcinomatous change[14–16]; and, though this may not be the majority view in this country, it has the support of many experienced surgeons, endocrinologists, and authors of textbooks. "For nodular goitre," one popular book teaches, "the only effective treatment is surgical; and partial thyroidectomy should be recommended not only to rid the patient of the deformity and for the relief of pressure symptoms, but because . . . in about 17% of cases carcinomatous change occurs eventually." [17] SPENCE [18] also considers it "advisable" to remove old-standing nodular goitres because of the danger of malignancy; and in a recent review of 574 patients with thyroid disease (all but 18 of whom had had surgical treatment) PATERSON BROWN says that "all nodular thyroids *in the younger age-group* require thyroidectomy." [19] To deal thus with all clinically detectable nodular thyroids would mean over a million operations in the United States,[13] and a third of that number in this country—or perhaps a fifth if the operation was restricted to the under 40s. And that is not all: even in non-endemic areas these palpable glands represent only a small fraction of all the thyroids that actually contain nodules. SCHLESINGER et al.[20] consider thyroid nodules palpable if they exceed 1 cm. in diameter—a stern test for the ablest clinician. They found that only 8% of nodular goitres discovered post mortem were potentially palpable; and even such potentially palpable nodules far exceed in number the nodules actually palpated in unselected symptomless patients.[21–23] Though lower figures are usually quoted in this country,[24] PERLMUTTER and SLATER may not be far wrong in their estimate that well over half of all thyroid glands, when carefully examined at necropsy, contain multiple or solitary nodules.

CRILE and others [25–27] believe that nearly all thyroid cancers develop in otherwise normal glands; other no less eminent authorities [28–30] take the opposite view. Theoretically, if goitres were more prone to become malignant than normal glands, there should be more benign and less malignant tumours in the old than in the young; and this is not the case. Moreover surgical series showing a high incidence of cancer in nodular goitre are always selected series, which can be very misleading when quoted without this essential qualification. Nevertheless, despite these objections, there are good reasons for believing that simple nodular goitre is, in fact, precancerous. In most endemic-goitre areas of the world the death-rate from cancer of the thyroid is higher than elsewhere. Forty years ago Swiss surgeons gave ample proof of this,[31] and it may seem unnecessary to say "most" endemic areas. But no differential mortality has been demonstrated in certain goitrous areas of America,[32] and there are other striking differences between the endemic goitres of the Swiss Alps, the Himalayan valleys, the Canadian plains, and the "goitre belt" which stretches from Cornwall to Derbyshire.[33 34] There is also experimental evidence to link nodular goitre and cancer of the thyroid. Whether its primary cause is an absolute or relative iodine deficiency, a known or unknown goitrogen, or some defect of metabolism,[35] nodular goitre is always associated at some stage with a raised output of pituitary thyroid-stimulating hormone (T.S.H.); and many nodular goitres respond dramatically to thyroid medication, which restricts the formation of this hormone.[36] Similarly, in the production of experimental cancer of the thyroid a sustained rise in T.S.H. output seems to be the common feature of different methods involving artificially induced deficiencies, the administration of thyroxine-inhibiting goitrogens, partial thyroidectomy, and irradiation of the thyroid.[37–39] But fundamental questions are still unanswered: why do certain areas and not others in the same gland respond by hyperplasia; why does the same stimulus evoke diffuse change in some glands and nodules in others; and why does a very small proportion of glands (and an even smaller proportion of nodules) undergo neoplastic rather than hyperplastic growth. One startling but by no means unsupported suggestion is that hypothyroid states diminish the natural resistance to cancer not so much of the thyroid

12. Wood, C., White, R. G. *Ibid*, 1956, **37**, 49.
13. Perlmutter, M., Slater, S. L. *New Engl. J. Med.* 1956, **255**, 65.
14. Cole, W. H., Majarakis, J. D., Slaughter, D. P. *J. clin. Endocrin.* 1949, **9**, 1007.
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16. Sloan, L. W. *Ibid*, p. 1092.
17. Bailey, H., Love, R. J. McN. A Short Practice of Surgery. London, 1956.
18. Spence, A. W. Clinical Endocrinology. London, 1953.
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28. Rundle, F. R. Joll's Diseases of the Thyroid Gland. London, 1951.
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35. Hutchison, J. H., McGirr, E. M. *J. clin. Endocrin.* 1954, **14**, 869.
36. Zondek, H., Leszynski, H. *Lancet*, 1956, **i**, 77.
37. Bielschowski, F. *Brit. J. Cancer*, 1955, **9**, 80.
38. Axelrad, A., Leblond, C. P. *Cancer*, 1955, **8**, 339.
39. Doniach, I. *Proc. R. Soc. Med.* 1956, **49**, 4.

gland itself as of the endocrine system or even of the whole body.[40 41]

Though arguments continue about the management of multinodular goitre, there is an almost surprising unanimity about solitary nodules. Whether removal is urged because the nodule may become malignant or because it is believed to be malignant from the start, most surgeons agree on immediate operation. But there are some complicating factors: not more than 10% of solitary nodules are palpable clinically; there is no post-mortem evidence for the statement that solitary nodules are most common at the junction between one lobe and the isthmus; their size bears no relation to their degree of malignancy and little to the pressure effects they cause; and their differentiation from multinodular goitres seems to become more, rather than less, difficult with growing experience (the final-year student seems to have little difficulty, though LAHEY [42] had a great deal, and some of the most experienced clinicians have stopped trying altogether [43]). But even if all or most solitary nodules could be diagnosed clinically, and even if most of them are or will become cancers, the term "cancer" must still be defined for surgical purposes; and that is very difficult to do. How is the surgeon to act on such statements as these: "in many cases of papillary carcinoma of the thyroid the resistance of the body is so high that fibrosis and calcification nearly . . . obliterate the tumour" [44]; often such tumours "fail to grow or cause any difficulty over periods as long as twenty or thirty years"; and, even after they have metastasised, "the metastatic tumour will frequently regress if the patient is given 3 grains or more of desiccated thyroid." [44] SLESINGER [45] has lately drawn attention to 2 examples of an unusual type of carcinoma in young children. The patients were alive and well four and seven years after "snow-storm" secondaries had been seen in their lungs. At the other extreme, there is the "bull-neck of the elderly"—the rapidly growing, infiltrating, compressing, and widely metastasising undifferentiated carcinoma. If this is the thin end of the statistician's wedge, its broad base is made up of follicular and especially papillary carcinomas, which are said to have a five-year survival-rate of over 70%, a ten-year rate of over 40%, and a twenty-year rate of over 15%.[46] Thyroidectomy may be a safe operation in most hands today; but, as Mr. RIDDELL shows on another page of this issue, it still has its pitfalls, and until we can anticipate with more certainty what a particular thyroid tumour will do, we might do well to be more critical in the choice of patients for operation.

A new aid to clinical selection, the needle biopsy,[47] is limited by the fact that, histologically, there is no such thing as a "normal thyroid." And it is not without danger, as CRILE [44] has emphasised. He recalls that as long ago as 1913 TYZZER [48] showed that simple massage of a malignant tumour in mice could increase the incidence of pulmonary metastases from 0 to 80%; and if the papillary carcinoma of the human thyroid can "explode" in the same way (as CRILE believes it may well do), then "sticking a needle into an operable cancer could be likened to plunging a percussion cap into a box of dynamite to test whether it really is dynamite or just a lot of saw-dust." Thirty years ago, when tiny nodules in the thyroid were disregarded by doctor and patient alike and "lateral aberrant thyroids" were treated by tiny doses of X rays, diet, or a pat on the back, spread of papillary carcinoma seems to have been extremely uncommon (in 1937 CRILE could find no reported case in the literature). Today, when such nodules are biopsied, enucleated, cut into, or anxiously fingered by examination candidates, "the journals are filled with reports of the dangers of papillary carcinoma . . . (and) cases of pulmonary metastases of those tumours." [44] The bogy of implanting cancer by surgery is, of course, by no means new (and it has not matured with age); but we cannot dismiss the possibility that the thyroid surgeon, operating on papillary cancer, may be spreading the disease.

A possibly better way to select thyroid nodules for operation has recently been described by PERLMUTTER and SLATER.[13] When radioactive iodine is given in diagnostic doses not only can its uptake by thyroid tissue be measured with the Geiger-Müller counter but, by using directional counts, nodules in the gland can be mapped out and their relative avidity for the isotope estimated. "Hot" nodules (which must not be confused with "toxic" nodules) take up more radioactive iodine than the contralateral normal lobe, and "cold" nodules often take up very much less. In agreement with others,[49–51] PERLMUTTER and SLATER believe that a large proportion of cold nodules either are or may readily become malignant, whereas hot nodules are almost always innocent. Patients with cold nodules are therefore advised to have them removed, whether they are euthyroid or hypothyroid; and patients with hot nodules are investigated further. Euthyroid patients are given thyroid to depress their T.S.H. output; and, as a result, most of their hot nodules rapidly disappear. Hyperthyroid patients, in whom toxic symptoms are more often masked than apparent, are advised to have either therapeutic doses of radioactive iodine or subtotal thyroidectomy. Another group of patients, in whom the total uptake of radioactive iodine may be as low as 10–20%, and who show no signs of myxœdema, illustrate some of the difficulties of the method. By far the commonest cause for a low uptake of iodine by the thyroid gland is previous administration of iodine: the very small quantities in cough-mixtures, tonics, and so on are sufficient to upset the count, and contrast media used in bronchography, cholecystography, and myelography may depress the count for several months. A low total uptake also suggests the possibility of thyroiditis, for Hashimoto's lymphadenoid goitre may present as a solitary cold nodule. Even when this diagnosis has been made, however, the issue is still uncertain, for it seems that Hashimoto's disease may also be a precancerous condition.[52]

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41. Ellerker, A. G. *Proc. R. Soc. Med.* 1955, **48**, 7.
42. Lahey, F. H. *Surg. Clin. N. Amer.* 1953, **33**, 781.
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44. Crile, G. jun. *Surg. Gynec. Obstet.* 1956, **101**, 161.
45. Slesinger, E. G. *Proc. R. Soc. Med.* 1956, **49**, 4.
46. McDermott, W. V. jun., Morgan, W. S., Hamlin, E. jun., Cope, O. *J. clin. Endocrin.* 1954, **14**, 1336.
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51. Dobyns, B. M., Maloof, F., Skanse, B. *J. clin. Endocrin.* 1949, **9**, 1171.
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Annotations

PROSPECTS IN PUBLIC HEALTH

THOSE who attended the meeting in London on Sept. 20 at which Dr. J. D. Kershaw was installed as president of the Society of Medical Officers of Health were rewarded by a sparkling presidential address.[1] Dr. Kershaw suggested that three things could harm the public-health service—Bureaucracy, Hierarchy, and Authority—"and all these influences are at large." When an administration became bureaucratic, then either the unit was too big or the man in charge of it was too small; and he deplored the tendency towards bigger administrative units. As regards Hierarchy, there was an almost irresistible pleasure in the power to order the doings of others; but, unless the junior officer was given responsibility as well as duty, the qualities which had made the service—the enthusiasm and the original thought of its members—would be stifled. "I can only hope that the bishops and the rural deans of public health will see what they owe to its parish priests and conduct themselves accordingly." As to Authority, "It is as well for us to remember that the newest recruit brings to his work a fresh viewpoint and is every bit as likely to have something to contribute to the shaping of public health as are our elder statesmen."

The service, Dr. Kershaw continued, was entering on a new phase—namely, the search for positive health in its widest sense—and he illustrated this by three examples—mental health, and the arrangements for the handicapped and for the ageing.

Knowledge of mental illness did not inevitably lead to understanding of mental health. Unfortunately, the development of psychopathology had had a fascination for humanity as a whole which was producing distressingly negative results. Psychology not only explained away the erring being's shortcomings but offered him the ineffable comfort of knowing that his upright neighbour was upright only because he, too, was psychologically out of balance. "There are to be no more sinners and no more saints but only a fellowship of the maladjusted. As a social philosophy this comes perilously close to Nihilism." A psychiatry which would stigmatise originality and individuality as signs of maladjustment could bring about as dangerous and deadening a uniformity as would ever be produced by mass-advertising Capitalism or mass-indoctrinating Communism. While one wing of psychiatry was moving rapidly in this direction, the other was seeing more than a glimpse of reality. Many psychiatrists were beginning to see that, however positive mental health might be defined, the prevention of mental ill health was largely a social matter.

Turning to his second example, Dr. Kershaw remarked that the hospital wards for the aged, "ten years ago grim places where the prisoners of infirmity waited for the release of death," are becoming for most patients places of hope. Whether the discharged patient had a pleasant twilight to his life or just a year or two of "medicated survival" depended on the social services of the health and welfare departments of the local authorities. The growing tendency to merge these two departments under the general direction of the M.O.H. was undoubtedly a move in the right direction; but Dr. Kershaw would welcome closer coöperation with the geriatric team. For the fit elderly, interest, activity, the feeling of usefulness, and the fellowship of others doing the same job all postponed the date of surrender to senility; and help towards gaining these must be freely given.

Considering, thirdly, the handicapped, Dr. Kershaw remarked that the transition from school to employment, difficult for the healthy adolescent, was infinitely more difficult for the handicapped; yet at this stage, when they most needed help, the handicapped had to rely on strangers—employers, youth employment officers, and disablement resettlement officers. Settling the handicapped adolescent in employment, and even reabling the disabled adult, were within the province of the public-health service.

In these three examples, as Dr. Kershaw remarked, the outstanding needs are social rather than medical; and this characterises all the major problems of the new phase in public health.

DANGERS OF CORTICOTROPHIN

IT is well known that corticotrophin (A.C.T.H.), by stimulating the adrenal cortex, has a favourable action in allergic conditions. When this was first recognised there were fears that the widespread use of the hormone might be dangerous, not only because of the pharmacological effects of impurities but also because sensitivity to the hormone, a foreign protein, might be induced. This fear was based partly on theoretical considerations, partly on previous experience with pituitary extracts, and partly on some experimental findings which suggested that guineapigs sensitised to horse-serum and treated with corticotrophin to prevent anaphylactic reactions become sensitised to the corticotrophin itself.[1] Early clinical experience did not bear out these fears,[2] but gradually it became clear that corticotrophin did in fact occasionally produce symptoms that were unmistakably allergic, ranging from slight urticaria to severe collapse.[1 3]

In a series of 208 patients, Brown and Hollander [4] estimated the incidence of these manifestations at about 3%, and they pointed out that a similar incidence of allergy could be expected from the therapeutic use of insulin or liver extracts. When patients were hypersensitive to the hormone, Brown and Hollander recommended the substitution of beef corticotrophin for the more easily available and widely used hormone derived from the pig. But 1 of their patients later developed a positive skin reaction to beef corticotrophin as well. Thorn et al.[5] considered that reactions to corticotrophin were produced by "inert protein rather than by A.C.T.H. itself" (in their opinion the incidence had decreased with the increasing purification of the hormone); but it is interesting to note that Feinberg et al.[1] reported a strongly positive skin reaction to a "sheep corticotrophin peptide" in a sensitive subject. Thorn et al. make an important point when they say that patients with adrenocortical insufficiency are particularly liable to react adversely to corticotrophin; but here again it must be noted that in the case recorded by Feinberg et al.[1] there was a severe reaction to corticotrophin despite preceding treatment with cortisone for twelve days.

At least 3 cases have been described [6–8] in which the administration of corticotrophin was followed by death; and these disasters should be studied carefully by every clinician who decides on treatment with corticotrophin in preference to cortisone or its related compounds. The age of the patients ranged from 17 to 27 years;

1. The address is to appear in full in the October issue of *Public Health*.

1. Feinberg, S. M., Feinberg, A. R., Brigg, E. *J. Amer. med. Ass.* 1951, **147**, 40.
2. See *Lancet*, 1951, ii, 158.
3. Wilson, L. A. *Ibid*, p. 478.
4. Brown, E. M., Hollander, J. L. *In* 2nd Clinical Conference on A.C.T.H. London, 1951.
5. Thorn, G. W., Jenkins, D., Laidlaw, J. C., Goetz, F. C., Dingman, J. F., Arons, W. L., Streeten, D. H. P., McCracken, B. H. *New Engl. J. Med.* 1953, **248**, 588.
6. Van Ufford, W. J. Q. *Int. Arch. Allergy, N.Y.* 1952, **3**, 229.
7. Hill, H. R., Swinburn, P. D. *Lancet*, 1954, i, 1218.
8. Eisalo, A., Leskinen, O., Oka, M. *Acta med. scand.* 1956, **155**, 1.

2 were treated for asthma [6 8] and 1 for exudative dermatitis.[7] An initially good response to corticotrophin was followed by a relapse which led to the resumption of treatment after an interval of varying length. All 3 patients died during the second course of treatment. In the 2 asthmatics an injection of corticotrophin was followed almost immediately by collapse and death. The patients described by Hill and Swinburn [7] survived for about eight days. There was no clear-cut personal or family history of allergy, but in the patient with exudative dermatitis sensitivity to streptomycin ointment developed during the course of the illness. Unhappily, corticotrophin was given in one instance for a "moderately severe" attack of asthma; and the other 2 patients showed what in retrospect seem to be definite signs of sensitivity to corticotrophin. A negative skin test,[6] combined presumably, with the then prevailing optimism about reactions to corticotrophin, encouraged the continued use of the hormone. It is of interest that in one case [7] the corticotrophin used for the challenging dose was derived from an animal different from that used for corticotrophin in the sensitising course.

Eisalo et al.[8] say that at present it is impossible to decide whether the ill effects were caused by the hormone itself or by some other substance present in the preparation. But they raise the important question whether the indications for the administration of corticotrophin should not be reconsidered, since in most cases some of the more potent adrenocortical steroids can be used with advantage. It may be argued that the use of corticotrophin is more "physiological" and that we have to learn "to coöperate with the patients' adrenals"; but for most conditions hydrocortisone or related compounds will usually be adequate. Perhaps the best antidote for a reaction to corticotrophin, if time permits, is hydrocortisone or cortisone itself. Wilson's patient [3] recovered from a severe illness after being treated with adrenocortical extract, among other things.

THE DUODENAL LOOP

THE diagnosis of duodenal ulcer is largely the responsibility of the radiologist, but even with the best technique it is not always possible to demonstrate the exact site of the ulcer crater. Teplick's observations [9] that "alterations in the normal rœntgen appearance of the duodenal loop are significant, and, at times, diagnostic of posterior penetration of a duodenal ulcer" are, therefore, interesting.

The changes consist in effacement of the normal mucosal outlines of the inner border of the descending limb, giving the segment a smooth and somewhat stiff appearance. A less constant finding is coarsening of the mucosal folds and, in 4 of the 10 cases described, the loop was slightly displaced, either posterolaterally or upwards. The part most commonly involved was the immediate postbulbar area, but sometimes the changes involved the entire descending limb. 9 patients were operated on: in 6 there was direct extension of the ulcer into the pancreas, and in the other 3 dense adhesions, resulting from posterior penetration of the ulcer, were found around the first and second part of the duodenum.

Teplick's illustrations of the loss of mucosal serrations along the inner border of the duodenal loop are convincing, though it may be that displacement of the duodenum is not so easily recognised, and more experience is needed to assess the practical value of these observations. They should, however, direct more attention to the radiological appearance of the descending duodenal loop, since any sign that will assist the accurate localisation and assessment of the type of ulcer, will be of value to radiologist and clinician.

9. Teplick, J. G. *Ann. intern. Med.* 1956, **44**, 958.

BILIRUBIN

THE normal pathway of hæmoglobin katabolism leads to the formation of the yellow pigment bilirubin, which is then excreted by the liver into the bile. The chemical or physical changes which bilirubin undergoes in its passage through the liver cells from the blood on one side to the bile capillaries on the other have defied elucidation for over forty years. The first major contribution to the solution of the problem was the demonstration by van den Bergh and Muller [1] that the pigment in the gall-bladder reacts directly with diazotised sulphanilic acid to give a deep purple colour, whereas the pigment in the plasma of healthy subjects reacts only in the presence of alcohol. That this indirect-reacting pigment is insoluble in water but soluble in alcohol seems to be the simplest explanation of these results and it was the one favoured by van den Bergh himself; but the instability of the direct-reacting pigment hampered all attempts to confirm this hypothesis.

The development of modern methods of partition chromatography led to the second big advance. Three years ago [2] we referred to the results obtained by Cole and Lathe [3] with their modification of this technique, which showed quite unequivocally that the direct and indirect pigments were distinct entities and that the direct-reacting variety itself consisted of at least two separate pigments. From the chromatographic behaviour of these various pigments, Cole and Lathe concluded that those giving the direct reaction were the more polar. Further work by them and others has both confirmed and extended these results.[4 5] Difficulties arising from the instability of the direct-reacting pigment were overcome [4] by using the dipyrryl azopigment formed when it is coupled with diazotised aniline. It was then obtained free from the similar pigment produced from any indirect-reacting bilirubin present by salting out with ammonium sulphate and extraction with methanol, followed by a series of counter-current distributions. After further purification the material was subjected to mild alkali hydrolysis which liberated a reducing substance subsequently identified as glucuronic acid.

These results have been completely confirmed by Rudi Schmid [5] using a slightly different technique. He has shown, moreover, that, although the greater part of the direct-reacting pigment is the diglucuronide of bilirubin, a small amount exists as the monoglucuronide in which only one of the two $\alpha\alpha'$ hydroxyl groups of bilirubin is linked with glucuronic acid.

Bilirubin therefore belongs to that large and heterogeneous group of substances that are conjugated in the liver with glucuronic acid. With bilirubin, as with the vast majority of these substances, the glucuronide is far more soluble in water than the parent substance, and in consequence more readily excreted in the urine. Glucuronic acid is by no means the only substance used by the liver to carry out these conjugations. Other substances known to be used are acetic acid, sulphuric acid, cysteine, glycine, glutamine, and ornithine. In several instances more than one is used. Thus, benzoic acid is not excreted exclusively in combination with glycine; a small proportion is often combined with glucuronic acid. It is by no means improbable that bilirubin is also not excreted exclusively in combination with glucuronic acid. Combination with one or more of the other substances might indeed account for the observation of Cole et al.[6] that "other diazo-positive pigments occur in bile and urine." For this reason it is not strictly accurate to regard direct-reacting bilirubin and bilirubin glucuronide as synony-

1. van den Bergh, A. A. H., Muller, P. *Biochem. Z.* 1916, **77**, 90.
2. *Lancet*, 1953, ii, 28.
3. Cole, P. G., Lathe, G. H. *J. clin. Path.* 1953, **6**, 99.
4. Billing, B. H., Lathe, G. H. *Biochem. J.* 1956, **63**, 6P.
5. Schmid, R. *Science*, 1956, **124**, 76.
6. Cole, P. G., Lathe, G. H., Billing, B. H. *Biochem. J.* 1954, **57**, 514

mous. In a letter on p. 683 Dr. Lathe suggests that the terms "indirect" and "direct bilirubin" should be replaced by "bilirubin" and "conjugated bilirubin" respectively. In the interests of precise terminology, Dr. Lathe's suggestion can be heartily endorsed.

HAND INJURIES

In deploring the great loss of industrial output caused by disputes and strikes, we should not forget that industrial accidents account for over four times as many man-days lost. Of these, over 20% are due to accidents to the hands. Quite apart from the loss of productivity, the cost of compensation alone is about £3,000,000 a year. And loss to the community certainly does not stop there, for the social effects of injury are often considerable.

A recent inquiry by Wilkes [1] into the causes and occupational and social results of hand injuries in men attending the hand clinic of the Royal Victoria Infirmary, Newcastle upon Tyne, is the extension of an earlier study [2] of infections of the hand. In the matter of infections, there was little evidence of delay before seeking treatment; such delay as there was usually arose because the patient did not like to bother his doctor or spare time for what might be a long visit to the surgery. Weekends were another cause of delay because there was no Sunday surgery and also because treatment might interfere with the patient's weekend activities. In 30% of cases there was no known history of injury preceding infections and in many of the other cases the injuries were trivial. As Williams and Miles [3] have shown, the most likely source of wound infection was the organisms of the individual's skin or nose, rather than contamination directly from the wounding agent. Wilkes concluded from the patients' statements that first-aid provisions varied widely and that there was much room for improvement. She also found that it was unusual to insist on the immediate treatment of every trivial injury: this course was supported by the findings of Williams and Capel [4] who demonstrated that in the factories they studied only 1–2% of individual wounds became septic, and insistence on the treatment of all wounds would demand five to ten times more surgery staff and accommodation as well as an intolerable loss of working time.

In her latest paper Wilkes considers only the social, economic, and occupational aspects of hand injuries. The data were obtained from the men during one or more interviews at the hand clinic. All the men were admitted for a short time and the usual length of stay was one week. There were almost as many injuries to the left hand as to the right, and wood workers had more left-hand injuries. Over 75% of the injuries involved the fingers only. Just over a third of the accidents were caused by machinery (had not 40% of the men been miners, the proportion of machinery accidents would certainly have been higher). Rank and Wakefield [5] and Bunnell [6] also found that working on and with machinery was the commonest circumstance associated with injury.

The financial cost of the injury to the individual was hard to assess. Many men eventually made up what they had lost if they received income-tax relief, disablement benefit, or awards for damages. The weekly loss for the men while they were off work varied around a mid-point of 70*s.*, but some lost over £8 a week. The self-employed were the hardest hit. Time lost from work varied from under eight weeks to over two years, and the average duration for all men was seven weeks. Barclay [7] found that patients with fingertip amputations remained off work for a comparatively long time, since it may take two or three months for the stumps to harden sufficiently to stand heavy work. A surprising number of men delayed return to work for several weeks after the hand clinic advised them to return. Nearly 75% went straight back to the jobs they were doing at the time of injury and more returned to their own work later. Only 7% were unable to do their pre-injury job because of hand disabilities. Wilkes records that employers were generally helpful. About two-thirds of the injured who claimed disablement benefit were awarded between 1% and 15%. About 5% of the men did not know they were entitled to benefit. Most of the men were very self-conscious about the appearance of their hands and some did their best to hide the disability. Although many could do their old work, they were often handicapped in their outside activities and hobbies, which represented a considerable loss to many of them; and others had appreciable pain and discomfort. An interesting point is that although injuries to the hand often caused severe and permanent physical disabilities there was seldom any occupational handicap: the effects in private life were more significant.

Having noted the facts and the consequences of injury, the importance of prevention is obvious, and it is clear that much can still be done to reduce the number of accidents. The report of the industrial safety subcommittee of the National Joint Advisory Council has lately discussed the prevention of industrial accidents in general.[8] Training and supervision, particularly of young workers, the design and guarding of machinery, and good order in factories are fundamental. Coöperation between management and men is likewise important. Piece rates and bonus systems which tempt men to work beyond the safe-rate have been blamed for many accidents. Carelessness, fatigue, or "accident proneness" are difficult to control or to assess, but they must not be underestimated in framing a preventive programme. Kanavel [9] emphasised the need for the factory doctor to analyse accidents and coöperate in prevention. He also pointed out the value of the financial incentive offered to firms in the United States, through the raising or lowering of insurance premiums according to their record of accidents. In America, insurance companies have for many years kept statistics for accidents, including details of the part injured and the cause of injury. Similar statistics might usefully be published in this country; and it might help the cause of accident prevention if firms insuring against the cost of industrial accidents paid premiums according to their experience. Several American insurance companies have their own occupational-hygiene laboratories which advise their clients on accident prevention and health in industry.

Prevention, first-aid, and expert surgical treatment are the first lines of defence; but rehabilitation is a vital consideration in reducing loss and suffering. The importance of reducing anxiety and the desire for compensation and of raising morale scarcely need emphasis. Kennon,[10] discussing crush fractures of the hand, doubted whether the patient should be told the nature of the injury, and he wondered whether the injury was not best treated by "studied neglect" because any other course might raise the matter of compensation and delay recovery. As Jones [11] has lately put it, "thought and movement of the hand have been welded together in common parlance, only by so welding them together in treatment can a successful result be attained. The interest of the patients must be engaged in each other and they must have not repetitive work but creative purpose."

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Special Articles

LABORATORY TESTS OF OPERATING-THEATRE STERILISERS

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BACTERIOLOGISTS are often asked to test the efficiency of the pressure sterilisers used in surgical operating-theatres to provide sterile dressings, gloves, packs, towels, gowns, masks, and so forth. Since the publication of Bowie's (1955) important observations on the apparatus used for sterilisation, we have noted an increase in the number of such requests, and our experience of testing sterilisers in several different hospitals in this area has led us to believe that we can usefully clarify a number of points which often seem to cause avoidable difficulty to surgeons and theatre sisters as well as to hospital engineers and bacteriologists—all of whose understanding participation is necessary to ensure the correct working of a theatre dressing-steriliser. Sterilisation of dressings depends on their being completely permeated by dry saturated steam on the phase boundary. When such steam permeates the dressings it condenses, leaving behind it a minimum of moisture, and yields up its wealth of latent heat. The efficiency of sterilisation is much reduced if the steam should be either wet or superheated. We describe here the test procedure which we have evolved and recount and discuss five illustrative experiences.

Hospital Engineer

Our first action in response to a request to test a steriliser is to inspect the instrument along with the hospital engineer. He examines the connections of the steriliser, checking in particular that there are no such faults as, for example, direct connections between the sterilising chamber and the underground drains or main water-supply (Bowie 1955). The engineer also examines whether the steam comes in at the top, as it should, and checks the pressure in the jacket and chamber. It is important that the pressure in the jacket should not greatly exceed that in the chamber; otherwise superheating will result, with greatly reduced efficiency of penetration but much increased damage to such articles as gloves. It is also important that the pressure should be great enough, if the steam comes from a distance, to ensure that the steam is dried during its passage through the reducing-valve attached to the steriliser.

The engineer also examines the arrangements for the discharge of air and condensate during sterilisation. This is a most important part of the investigation, and it is depressing how seldom this function of the steriliser is found to be in good order. Some sterilisers still lack any provision for the discharge of air and condensate during sterilisation; others do not have automatic devices to control the discharge. Often the discharge channel is blocked; and oftener still the steriliser is so designed that there is no means whereby the person in charge of sterilisation may observe by inspection whether the condensate is being discharged or not. Unless this part of the steriliser is right, or is put right, the instrument is very likely to fail in its purpose. One difficulty is that failure to secure complete discharge of air and condensate may lead to the formation of air locks unevenly distributed throughout the load in the steriliser. This means that bacteriological and other test material may give a misleading result unless samples for test are very widely distributed within the load in the steriliser. We have repeatedly had experience of different results with material placed in different parts of the same steriliser (see below).

The engineer also checks whether an adequate vacuum can be drawn and he checks the accuracy of the thermometer, if one is incorporated, as it ought to be, in the discharge channel near the port. If a thermometer is not incorporated, the engineer examines whether it is possible to fit one. It must be clearly emphasised that a steriliser used without such an indicating thermometer is being run by mere guesswork. The thermometer is essential to check whether the sterilising agent is dry saturated steam on the phase boundary—i.e., steam at 109°C for a pressure of 5 lb. per square inch, 121°C for 15 lb. per square inch, 126°C for 20 lb. per square inch, and 135°C for 30 lb. per square inch. If there is such a correspondence between the thermometer readings and those on the pressure gauge, phase-boundary steam is available; if such steam is not available, there is no guarantee that the sterilisation will be effective. If the two readings do not correspond, there is a fault in the steriliser which should be put right before any tests are done on it.

The timing of the sterilisation process should begin from the moment that the thermometer registers the temperature appropriate to the pressure. Bowie's (1956) recent publication shows the need to have a steam-trap fitted, of a balanced-pressure type, set to open automatically at 2°F below the condensate temperature of pure steam; but these have not hitherto been fitted to sterilisers made in Great Britain. Those normally fitted operate at a difference of 5, 15, or 20°F. It is not difficult, however, to acquire and fit a properly balanced steam-trap and this should be done. As Bowie (1956) rightly insists: "the heart of a dressing steriliser is the steam trap on the automatic air and condensate chamber discharge channel. . . ."

In our view, the engineer's inspection and the actions taken as a result of it are more important than any laboratory test. We believe that bacteriologists will do much good by not testing sterilisers without their being fully checked by the engineer. The duty of the bacteriologist in relation to the engineer is to give him in exact detail what is required, to explain the reason for his demands, and to refrain from making tests until the engineer is satisfied with the instrument and its connections.

Operating-theatre Sister

The next stage of the test requires the understanding and support of the operating-theatre sister and steriliser attendant. In our experience, both are usually most conscientious and responsible persons. The theatre sister is usually willing to coöperate fully but very anxious to prove that all that has been done has been well done. The bacteriologist's first duty towards her is to explain why tests are required, and there is no reason why he should conceal that most of the difficulties arise from equipment whose design is far from ideal. When we tested sterilisers without a preceding examination by the engineer we not infrequently found that test spores were killed in one part of the steriliser but not in another. Failures were commonest, as would be expected, in drums near the bottom of sterilisers because steam entering at the top displaces air downwards; and we have sometimes found test material killed at the top and in the middle of a large drum but not in the foot of it, even when the drum was not at the lowest part of the steriliser. When evidence of this kind is given to some theatre sisters they are very liable to discount the whole process of testing as absurd. This may be a natural defensive reaction, for most theatre sisters know well enough that uneven killing of test spores within a single drum suggests

that it has been too tightly packed—always on the assumption that the steriliser is working with pure steam and provides for efficient discharge of air and condensate during sterilisation. Theatre sisters often know very well that their drums are packed too tightly, not because of indifference or carelessness but because the maximum daily turn-over of their inefficient sterilisers is often unequal to the demands. It is very important to uncover this situation when it exists—as it does rather often—and to bring it to the notice of the surgeon in charge, for it is remarkable how seldom the theatre sister herself will press a point of this kind. Nevertheless it is often the reason why drums are too tightly packed.

Laboratory Test Material

As test material we made up small dressing-bags containing :

(1) Spore suspension dried on filter-paper made by immersing the paper in a 4-day broth subculture of an aerobic spore-bearer; when placed in a tube of Robertson's meat medium these spores on filter-paper resisted one hour's immersion in a bath of boiling water and exposure in a laboratory autoclave to 5 lb. per square inch for 5 minutes—they were killed after 1½ hours in the water-bath and 10 minutes in the autoclave.*

(2) Swabs contaminated with dust swept from the hospital corridors (if this dust is put on a swab and this in turn is put in a tube of Robertson's meat broth, the spores resist immersion in a bath of boiling water for at least 2 hours).

(3) A steriliser control tube (Browne steriliser control tubes type 1 for dressings or type 2 for gloves).

(4) Six unsterilised dressing-swabs.

The test spores on filter-paper and the dust-contaminated swabs are each enclosed in separate soft-paper envelopes; the six unsterilised swabs are not enclosed in envelopes, since they are included to test whether loads are contaminated during the drying process which follows sterilisation. Browne tubes are placed in strategic situations as widely as possible throughout the steriliser, and each test bag contains at least one. In any test of a steriliser it is desirable to include at least three such test dressing-bags : one at the top, one in the middle, and one at the bottom of the steriliser. When the bags are received at the laboratory, after having been placed in the steriliser with a normal load during sterilisation, the swabs from the bags are cultured individually, each in a wide-mouthed boiling-tube containing Brewer's thioglycollate medium. The tubes are incubated at 37°C for 4 days before being declared sterile. The spores dried on filter-paper are placed in small conical flasks of Brewer's medium and incubated under the same conditions as the swabs.

In tests carried out in this department, both types of Browne's tubes changed colour from red through amber to green in the time and at the temperature claimed by the manufacturers. Incorrect storage at a temperature of 70°F or above may, however, cause deterioration. Above 70°F the hydrolysis reaction, on which the colour change from red to green depends, is prematurely started during storage, with the result that such tubes inserted into drums undergoing sterilisation may change colour without being exposed to an adequate temperature. Two types of Browne control tube are available for routine use in operating-theatres. Type 1, used in sterilisation of dressings, towels, gowns, and so forth, changes from red to green after exposure to 115°C for 25 minutes (or at a higher temperature for a shorter period). Type 2, used during sterilisation of gloves, changes colour if exposed to 115°C for 15 minutes.

Results of Tests of Sterilisers

We have tested dressing-sterilisers in several institutions, including a large general hospital and some smaller hospitals which nevertheless undertake major surgical work. We found many defects : nearly all of the sterilisers were of outmoded design and possessed neither automatic steam-trap nor thermometer on the air-steam condensate discharge-channel. Several were mechanically defective and needed urgent repairs. Our tests revealed in some cases unsuspected mechanical faults and in other cases errors in the technique used by the theatre staff in the sterilisation process.

The following account of our findings with five sterilisers illustrates our experiences during the past 12 months :

THEATRE A

The original object of the investigations in this theatre was to determine whether dressing-packs were being contaminated during storage for 4 or 5 days in a cupboard in a room adjoining the sterilising-room. This steriliser was not first examined by the hospital engineer, and in our first tests of it we did not include control tubes.

In each of two separate trials, five test packs, each consisting of four towels, six unsterilised (= "test") swabs, and one dust-contaminated (= "indicator") swab in an envelope, were exposed at the same time as in the sterilisation of dressings, and by the procedure used routinely—i.e., at 20 lb. pressure for 20 minutes followed by 40 minutes' drying. They were then placed in the cupboard in the usual way, and after 24 hours' storage the first pack was sent to the laboratory for testing, two of the six test swabs and the one indicator swab being cultured from each pack. The other packs were removed for testing on succeeding days and gave the results shown in table I.

With three exceptions, the ten indicator swabs contaminated with dust were sterile, and from two of these swabs only cocci were grown. One swab (from pack no. 8) was enclosed with a control tube showing a satisfactory colour change. Like all the others found in these tests, the cocci were gram-positive and coagulase-negative; they were not further studied. On the other hand, all but three of the twenty test swabs yielded bacteria. These findings suggested to us that the original sterilisation was probably effective for most of the packs, but that contamination had taken place after the exposure to steam. As packs were found to be contaminated after only 24 hours' storage, it seemed that contamination during the drying process was a possibility.

The steriliser itself was then examined along with the engineer, and several defects were discovered. The steriliser had no provision for filtering air drawn in during the drying process. It carried no thermometer on the chamber discharge-channel; air and condensate were supposed to be evacuated during sterilisation by means of a valve on the discharge-channel, but this was wrongly kept closed during sterilisation, with wet dressings as a result. The steam valve was leaking,

TABLE I—RESULTS OF LABORATORY TESTS OF DRESSING-STERILISER IN THEATRE A

Pack no.	No. of days between sterilisation and testing	Culture of "Test" swabs		Culture of "Indicator" swab	Browne tube (type 1)
		1	2		
1	1	Cocci	Cocci	Sterile	
2	2	Cocci	Cocci	Sterile	
3	3	Cocci	Cocci	Aerobic sporer	Not included in test
4	4	Sterile	Aerobic sporer; cocci	Cocci	
5	4	Sterile	Cocci	Sterile	
6	1	Cocci	Sterile	Sterile	Green
7	2	Cocci	Cocci	Sterile	Green
8	3	Cocci	Cocci	Cocci	Green
9	4	Cocci	α-Hæmolytic streptococci	Sterile	Green
10	6	*Cl. welchii*	Cocci	Sterile	Green

"Test" swabs were packed and put in the steriliser in the usual way. They were included to check air contamination at any stage.

"Indicator" swabs were deliberately contaminated with dust and packed each in a separate envelope. They were included to check whether sterilisation was effected in the first place.

Browne tubes (type 1) change in colour from red to green after exposure to 115°C for 25 minutes or to a higher temperature for a shorter period.

* Agar-slope subcultures resisted exposure in a laboratory autoclave operated at 5 lb. pressure per square inch for 15 minutes.

TABLE II—RESULTS OF FURTHER LABORATORY TESTS OF DRESSING-STERILISER IN THEATRE A

Date of test	Pack no.	Culture of			Browne tube (type 1)
		"Test" swabs		"Indicator" swab	
		1	2		
April 30, 1956	11*	Sterile	Sterile	Sterile	Green
,,	12	*Cl. welchii*; cocci	Cocci	Sterile	Green
May 4, 1956	13*	Diphtheroids	Sterile	Sterile	Green
,,	14	Cocci	Sarcinas	Sterile	Green
,,	15	*Cl. welchii*	*Cl. welchii*	Sterile	Green

* Packs nos. 11 and 13 were withdrawn before the drying process; nos. 12, 14, and 15 were dried by air being drawn through the load, as usual, for 40 minutes after sterilisation. See table I for explanation of "test" and "indicator" swabs.

and the handle on the door was broken, with the result that it could not be properly closed, and so an adequate vacuum could not be obtained. The working instructions had been repeatedly changed and differed from those issued by the manufacturers.

The engineer repaired most of these faults except provision for an air filter, which involved a major structural alteration. Tests were then repeated: this time two and three test packs were used on two occasions, the first pack being removed immediately after steam sterilisation and before drying, while the remaining packs were left to undergo drying in the usual way. Table II shows the results of examination of the packs. Thus of four test swabs from the packs nos. 11 and 13, which were removed before drying, three were sterile and one was contaminated by diphtheroids. (This may have happened during manipulation in the laboratory.) Of six test swabs from the dried packs, all were contaminated, three of them with *Clostridium welchii*. The sterility of all the indicator swabs and the change in colour of the control tubes suggested that sterilisation was effective in the first place. The contamination of the test swabs in the dried packs confirmed that, as had been suspected, contaminated air was being drawn through the dressings during the drying process after sterilisation.

THEATRE B

The dressing-steriliser in this theatre was examined after a complaint that dressings were often wet on removal after sterilisation. This instrument was an old-fashioned model containing neither automatic steam-trap nor thermometer in the chamber discharge-channel. The hand-operated valve on the air-condensate discharge-channel was defective; hence the evacuation of air from the chamber was necessarily incomplete. No recordable vacuum could be drawn. The marking of the valves was different from that used in the diagram and instructions alleged to have been issued by the manufacturers, with the result that the staff had no clear idea of the function of the controls they were operating. Working instructions had been changed and differed in many important respects from those issued by the manufacturers. Gloves were sterilised at a pressure of 7 lb. for 10 minutes, which we consider to be inadequate to ensure safety. Dressings were sterilised at 16 lb. for 45 minutes and required $1^1/_2$ hours' drying.

The hospital engineer then repaired the mechanical defects found. A new valve was inserted into the chamber discharge-channel, and the staff were instructed in its use. After much difficulty the exhauster was adjusted so that a vacuum of a few inches could be drawn. The pressure regulator for use during the sterilisation of the gloves was altered so that a pressure of 10 lb. was obtained. This was maintained for 20 minutes. Investigations were then made by inserting Browne control tubes and a few spore cultures into the packs and drums being sterilised. The results showed that most of the dressing-drums were sterilised satisfactorily, but occasionally a control tube did not change colour—nearly always in a tightly packed drum. Control tubes in glove drums showed more failures than those in dressing-drums. In this test all the spore cultures inserted were sterilised.

Further tests were carried out a few weeks later after a report that great difficulty was being experienced in changing the colour of control tubes in the sterilisation of gloves. Accordingly three test packs were inserted into the steriliser in the following situations: (1) at the top, under the air-filter inlet; (2) in the middle; and (3) on the floor near the chamber discharge-channel port. All the test swabs were sterile, indicating that filtration of the air was probably efficient, but the dust-contaminated indicator swabs in the pack on the floor of the instrument were not sterilised. It seemed that this was due to inefficient evacuation of air from the chamber, and further inquiries revealed that the valve controlling this on the air-condensate discharge-channel was being incorrectly used, being kept closed until during the drying process. This error has been corrected, but it must be said that hand control of the air-condensate discharge is far from satisfactory.

We consider that instruments such as this put an unjustifiable strain on those responsible for using them, quite apart from the excessively long time necessary to dry dressings. Such a process is very destructive to such things as gloves and is potentially liable to contaminate dressings already sterilised. In the present case the prolonged drying also caused great inconvenience in a busy theatre.

THEATRE C

The dressing-steriliser in this theatre was a recently installed new model with an automatic steam-trap on the air-condensate discharge-channel. Unfortunately the discharge of air and condensate began at 15–20°F instead of 2–3°F below the temperature of the chamber steam at phase boundary. No thermometer was fitted in the chamber discharge-channel. Dressings were sterilised at 30 lb. for 20 minutes, and gloves at 7 lb. for 20 minutes. On our instructions the hospital engineer changed the regulator so that gloves could be sterilised at 14 lb. After a complaint from sister that dressings were not being dried in the time recommended by the manufacturers this was increased from 20 to 30 minutes. Tests were made in the usual way. All the spore cultures were killed, and a test pack placed under the air filter showed no contamination, but it was also found that occasionally Browne control tubes did not change colour in the larger dressing-drums; more often failures were found in the glove drums. In this theatre the large drums were often considerably overpacked owing to the difficulty of supplying sufficient dressings, towels, and the like to meet the demands of a very busy theatre. Once this was corrected, test material invariably showed satisfactory results so far as ordinary dressings were concerned. In the glove drums it was far more difficult to secure satisfactory results, and there are still occasional failures from time to time. The failures may well arise from faulty evacuation of air, which seems to be far more liable to give trouble with sterilisation of gloves than of dressings. The lack of sensitivity of the valve of the automatic steam-trap may be partly to blame for this.

THEATRE D

The steriliser in this theatre was a small vertical one producing steam by means of gas burners situated beneath the instrument. The steam was correctly directed to penetrate the load from above downwards. Although comparatively recently installed this steriliser was fitted with neither a thermometer nor an automatic steam-trap on the air-condensate discharge-channel. Dressings were sterilised at 20 lb. for 30–40 minutes and then dried for 70 minutes. Gloves were sterilised at 12–15 lb. for 15 minutes followed by 15 minutes' drying. The air filter was not used in this steriliser, and drying was done by drawing a vacuum only.

The insertion of control tubes showed occasional failures to change colour—particularly in the sterilisation of gloves. An interval of at least an hour had to elapse after sterilisation was completed before the process could be repeated. The interval was required to allow the jacket to cool and to be emptied, refilled, and raised again to the required temperature and pressure. Thus, if any drums had to be resterilised, great inconvenience was caused to the staff.

Repeated tests did not disclose any one gross defect: spore cultures tested were all killed, but from time to time occasional Browne tubes in a load failed to change colour. Adverse influences probably contributed to this—e.g., the evacuation of air was certainly not as satisfactory as if it had been effected through an automatic steam-trap, but at least the valve on the chamber discharge-channel was being correctly and conscientiously operated; again, some drums were lined with heavy calico, which is unsatisfactory because it does not permit free penetration of steam; occasionally some drums were overpacked. Recent results from this theatre have been more satisfactory, and for some weeks there has not been failure to change a control tube in any part of the loads.

THEATRE E

This theatre had been recently equipped with a new dressing-steriliser. It was fitted with an automatic steam-trap on the air-condensate discharge-channel but lacked a thermometer. Sterilisation of gloves was most unsatisfactory in this instrument, and at 10 lb. for 15 minutes spore cultures were not killed and control tubes failed to change colour. Setting the steriliser to operate at 15 lb. pressure for 20 minutes also did not kill spores or change the colour of the control tubes. The only mechanical fault discovered was that instead of obtaining a vacuum of 20 inches only one of 15 inches could be drawn. This was due to leakage of air at the joints and has since been rectified. Faults were found, however, in the design and use of the drums. As these contained small openings on two sides only, they had to be turned on their sides so that air could be displaced downwards through apertures on the opposite side of the drum instead of being trapped against a solid containing wall. Control tubes placed outside the drums regularly changed colour, in contrast to an absence of change in the tubes inside the drums. This seemed to indicate that the design of the drums was probably preventing adequate penetration of steam and was responsible for the unsatisfactory results of the tests.

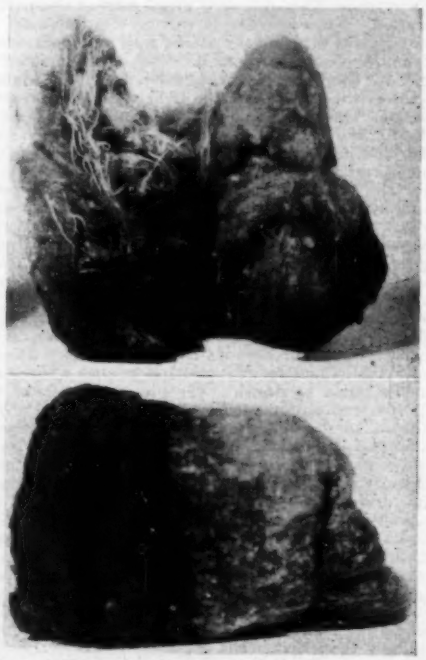
Discussion

Bowie's (1955) clear and closely reasoned account of the defects in design of a high proportion of operating-theatre dressing-sterilisers in this country is a publication whose importance for British surgery does not as yet appear to have been fully understood. Surgeons who feel some concern in the matter generally ask for a laboratory test to demonstrate whether their sterilisers are efficient. Bowie (1955) himself has emphasised the limitations and misleading possibilities of such tests, and there is much to be said for this attitude, which is also that of Walter (1948).

We readily agree that bactericidal tests applied in a routine fashion to sterilisers of bad design may do more harm than good. Nevertheless we believe that bacteriologists invited to assist surgeons in their problems of sterilisation will require to make use of some tests. In spite of their limitations these tests may be useful if they show, for example, that a defective steriliser cannot kill spores in hospital dust. The tests are of value also in checking whether the treatment of engineering defects has corrected a sterilising deficiency already shown to exist. We emphasise, however, that the testing of a steriliser should begin with a joint inspection of the steriliser by the hospital engineer and the bacteriologist, and a discussion of its operation with the surgeon and his theatre staff.

In setting up tests for sterilisers, bacteriologists often concentrate on providing highly resistant test spores. This may not be the most useful approach. The heat sensitivity of sporing cultures and even of spore suspensions varies greatly from time to time, and we are inclined to favour the use of swabs contaminated with hospital dust; this material usually contains spores in a dried state that resist boiling for more than 2 hours, and it poses a problem which is at least of the same order as the daily tasks which the steriliser is required to accomplish. We have been impressed, however, by finding that test spores, whether from cultures of known high resistance or from dust, tend to be killed by temperatures and in times insufficient to change the colour from red to green of Browne steriliser control tubes. Such tubes and similar devices tend to be dismised as "unreliable" without the nature of the unreliability being understood. Our tests of Browne tubes in an oil bath show that if the tubes are stored at less than 70°F—an important point not always understood—they will change colour exactly as they are described as doing (i.e., after 25 minutes at 115°C for type-1 tubes). At 121°C the colour change from red to green was observed to be complete in 18 minutes. Tubes stored at temperatures above 70°F are unreliable in that they may already show some colour change during storage and will turn green too readily on heating. Although it is true that dry heat will effect the colour change—and we agree that this is a limitation—it is nevertheless both sensible and reliable to conclude that dressing-drums or packets in which a tube has failed to change to green have not been fully penetrated for long enough by steam of assured sterilising quality. Those who dismiss such tubes as unreliable should nevertheless understand the warning conveyed by any colour, other than an unequivocal green. Any such colour may be confidently accepted and must be acted on as evidence that sterilisation may not have been effected. In our view the great value of these tubes is that they provide instant and easily demonstrable evidence of failure to attain a safe temperature. They often show clearly that the distribution of steam is uneven within a particular steriliser or even within individual drums or packets. Unlike Spooner and Turnbull (1942), whose conditions and materials were different from ours, we have not yet found Browne tubes turn green without adjacent spores being killed, but we have observed the converse often enough to think that tests of sporicidal power alone—even with spores that resist more than 2 hours' boiling—may be less stringent than most bacteriologists suppose. At the very best, moreover, results of spore tests are delayed for 3 or 4 days at least, by which time memories of the details of the sterilising run that produced them may have become uncertain.

In addition to an engineer's inspection and to tests with Browne tubes and spores we think it very important to culture exposed test swabs in the ordinary load to check whether, as in theatre A, the drying process leads to contamination. Tables I and II show our evidence for thinking that this may be important. Admittedly the steriliser in question was producing wet loads for an avoidable reason and the drying process was often prolonged well beyond even the 40 minutes admitted. (Loads in sterilisers of bad design are often so wet as to require and receive drying in currents of air for 2 hours or more.) Moreover, the steriliser in theatre A lacked any provision for filtering air, but we found two sterilisers



Proximal and lateral aspects of plug of cotton-wool used as "air filter" in an operating-theatre dressing-steriliser. (Actual size.)

(not included in this series) in which an air filter was not being used although there was a container designed to hold one; and we found another steriliser containing as an air filter the material shown in the accompanying figure. It seems quite likely that plugs of cotton-wool like this may contribute more organisms to the current of air than they remove.

In our account of the five sterilisers described we refer more than once to the degree of vacuum that could be drawn. We do not wish this to be taken as evidence that we commend the drawing of a high vacuum before sterilisation. As Bowie (1955) has emphasised, such a procedure may cause superheating of steam, with defective penetration of bundles and much risk of destruction of the surfaces of heat-sensitive materials, such as surgical gloves. A steriliser with an efficient automatically operated air-condensate discharge mechanism will ensure that the steam reaches all parts of its load, even if no vacuum or only a moderate one is employed. The importance of vacuum, still much emphasised in the instructions issued from many quarters, is a relic of the days when sterilisers were so designed that air and condensate were not automatically discharged during sterilisation.

The widespread use of metal drums to contain supplies undergoing sterilisation deserves comment. The use of such drums has been condemned by several American workers (McCulloch 1945, Walter 1948, Perkins 1954) as quite unjustifiable, both because the drums hinder the free penetration of steam into their contents and because their use invites overpacking. Our experience certainly confirms this, especially as regards the large dressing-drums, which we found in every theatre visited. We suggest that supplies for sterilisation should be made into packs not bigger than 12 × 12 × 20 inches, wrapped in two layers of permeable cloth. Packs stored in a clean dust-free cupboard are generally regarded as sterile for at least a week—a point which would have to be checked for any particular set of storage conditions.

On the general question of what is the effect of sterilising efficiency (or the reverse) on the incidence of postoperative sepsis in clean wounds we have no evidence of our own. Nevertheless readers of the medical press are seldom long without some account of serious postoperative infection—see, for example, Robinson et al. (1946), Sevitt (1949, 1953), *Lancet* (1953), Blowers et al. (1955). Perhaps unclean operating-theatre air may sometimes contribute its quota of trouble indirectly by contaminating the contents of sterilisers during the process of drying. The true incidence of postoperative infection is seldom fully recorded, and for various reasons its true incidence may sometimes be concealed from surgical chiefs. In a classical study Meleney (1935) recorded how an accurate and truthful observer estimated an incidence of postoperative sepsis of 2%. Meleney estimated that it would be 5%, and then found, on examining all wounds himself, that in fact it was 15%. He cited unpublished observations that the incidence in another unit was 30%.

We agree with Bowie (1955) that consultation between the profession and the manufacturers of sterilising equipment is urgently required; administrators will be equally anxious to see movement in this direction. We think that there is great need for a better understanding, among surgeons and bacteriologists alike, of the technical requirements for efficient sterilisation of surgical dressings. Meanwhile we are inclined to treat individual problems of sterilising on the lines indicated here and to press for:

(1) The fitting of thermometers on air-condensate discharge-channels.

(2) The fitting of automatic air-condensate discharge mechanisms of efficient design (Bowie 1956).

(3) The provision of adequate filtration of air.

These steps are neither difficult nor expensive, and they represent the very least that should be done until new equipment of simple and satisfactory design is generally available. Sterilisers that cannot be fitted with modern automatic steam-traps should be discarded.

Summary

1. This paper quotes the results of laboratory tests of the sterilising efficiency of five operating-theatre dressing-sterilisers.

2. In different ways each of the sterilisers fell short of reasonable standards of efficiency.

3. We found that culture of test spores led to more optimistic assessments of a steriliser's efficiency than did the use of Browne's indicator tubes, which give a colour change from red to green.

4. We found also that sterilised loads could be recontaminated during the drying process.

5. We give an account of how we think that operating-theatre dressing-sterilisers should be tested.

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LIVING TO WORK?

IN his address to the annual general meeting of the National Council of Social Service on Sept. 25, Mr. John Marsh, director of the Industrial Welfare Society, discussed the effect on family life of today's complexities of living and working. Many mothers of young children were at work—far too many if we were alert to the warnings of Christian conscience—and he hoped that husbands and wives could forget that they were "employees" in their spare time. The demands of work so conditioned our days and nights that we seemed to live to work instead of vice versa. The amount of shift work was bound to increase and that would often be harmful to the unity of family life. In many of our industrial plans for this increasingly technological age, shift work was the only effective way to keep production costs down. Turning to recreation, Mr. Marsh said that for many people television was not refreshment: it was an escape from the responsibilities of life—at a time when the challenge to our way of economic, political, and social life was greater than ever before. Family life was still disintegrating according to many experts, and none of us could be complacent about this in a materialistic age when passing the buck for awkward responsibilities was the first thought for many. Sooty was no substitute for a romp in the garden with father, neither was rock 'n' roll the fault of teenagers whose parents had never developed the art of conversation with eager positive youngsters, as so many of them were when given the right beginnings at home.

The solution to these and other problems of living lay, Mr. Marsh believed, in one simple statement by Mr. Mettle-Nunoo, of the Gold Coast, who spoke at the recent Commonwealth study conference on human problems of industrial communities: "People are happier and better citizens if they are encouraged to think and put effort into doing things for themselves, the family, and the family group."

Conferences and Congresses

INTERNAL MEDICINE

THE Fourth International Congress of Internal Medicine was held in Madrid from Sept. 19 to 23 under the presidency of Prof. NANNA SVARTZ (Sweden); the president of the congress committee was Prof. C. JIMÉNEZ-DIAZ (Spain), with V. GILSANZ as secretary-general and J. C. DE OYA and J. GIMENA as secretaries. The scientific meetings were held in the impressive modern buildings of the faculty of medicine in the University City of Madrid. The congress was attended by 900 people. Headphones gave the communications in the original language, and in English, Spanish, French, and German translation.

The scientific programme was arranged partly around two main themes—the Rôle of the Adrenals in the Pathogenesis and Evolution of Internal Diseases, and Bronchial Asthma and Emphysema—and partly in the form of free-choice communications. All the contributors spoke by prearrangement, so there was no opportunity for formal discussion of the communications.

The first plenary session was given to a discussion on the Present Position of Internal Medicine. The speakers who had been invited to take part in this were H. Alessandri (Chile), H. H. Berg (Germany), W. Hadorn (Switzerland), S. Hurwitz (U.S.A.), N. Svartz (Sweden), L. Villa (Italy), and the late Prof. A. Lemierre (France), whose contribution was read by Prof. Justin-Besançon. In general, the discussion followed familiar lines in a slightly unfamiliar way. The unity of human biology and the ideal of service to the individual patient were stressed as possible means of preserving the integrity of medicine in the face of growing specialisation. Professor SVARTZ made the useful point that the best safeguard against fractionation of medicine was to have departments of general medicine with a big enough staff to allow the members time both to pursue their separate interests and to discuss them with their colleagues, with whom they joined in the general care of patients.

Adrenals in the Pathogenesis and Evolution of Disease

G. MARAÑÓN (Spain), in a personal experience of 612 cases of Addison's disease, many of them tuberculous in origin, had noticed that maintenance treatment with cortisone did not appear to increase the progression of the tuberculous disease. He deplored the indiscriminate use in hypertensive patients of adrenalectomy, which he regarded as an essentially unphysiological approach.

O. GARROD described the methods of steroid estimation currently employed by Mrs. S. A. Simpson and Dr. J. F. Tait and recounted results which they had obtained. There was no consistent diurnal variation in aldosterone excretion. The output of aldosterone could be consistently suppressed by increasing the intake of sodium chloride, and this occurred without any significant variation in hydrocortisone excretion. The change in aldosterone output was closely related to increase in body-weight, and less clearly to any change in plasma sodium or potassium level. At normal levels of sodium and potassium excretion, the Na/K ratio in urine did not correlate with aldosterone output. Normal outputs of aldosterone were found in a few patients with nephrotic or cardiac œdema when the salt in their diet was unrestricted. They had failed to influence aldosterone output by a dose of corticotrophin which raised hydrocortisone excretion to 1200 μg. per day.

Turning from secondary to primary aldosteronism, Dr. Garrod and his colleagues had made observations on 3 patients with Conn's syndrome and on 2 patients with adrenal carcinoma causing Cushing's syndrome and profound hypokalæmia. In 2 of the 3 patients with Conn's syndrome, aldosterone output was normal or only slightly raised, but after removal of the tumour it fell to very low levels, suggesting that the production of aldosterone by the tumour had suppressed production by the remainder of the adrenals. In another patient, high potassium intake did not increase the aldosterone output, suggesting secretory autonomy of the tumour. The secretory activity of two of the adrenal tumours had been assayed: one produced mainly aldosterone, but in another there was also a high production of corticosterone.

The observations in the 2 patients with adrenal carcinoma were also of great theoretical interest; for they showed a low excretion of aldosterone, and a massive excretion of hydrocortisone and corticosterone. In view of the hypokalæmia, this suggested that in these patients the "glucocorticoids" were exerting effects usually attributed to "mineralocorticoids"; so the differentiation into these two functional groups was not a rigid one.

J. ROSKAM and H. VAN CAUWENBERGE (Belgium) discussed the various tests of adrenal function; in their view, excess of 17-hydroxycorticosteroids in blood or urine was the best available index of adrenal overaction.

P. H. FORSHAM and V. C. DI RAIMONDO (U.S.A.) pointed out that, because of diurnal variation in hydrocortisone production, administered hydrocortisone could be used in a single 8 A.M. dose to tide a patient with rheumatoid arthritis over a matutinal "cortisone low" during which his joints were at their stiffest. Suppressive use of hydrocortisone entailed giving it in divided doses, including the night period. The response to corticotrophin was variable, some patients secreting a higher proportion of 17-hydroxycorticoids to adrenal androgens than others.

F. GROSS (Switzerland) described detailed comparative studies in normal and adrenalectomised dogs of the effects of various steroids. Aldosterone was very effective in maintaining sodium and potassium balance, but it did not restore a normal response to water-drinking. Normal water diuresis could be restored by hydrocortisone and related steroids.

R. S. MACH and A. F. MULLER (Switzerland) reviewed the factors which were known to influence aldosterone secretion; these included low sodium intake, administration of potassium, and diminished volume of body-fluid. When acute sodium depletion (induced by playing tennis in the sun) was accompanied by water depletion, aldosterone was definitely increased; but when the fall in fluid volume was prevented by water-drinking, there was scarcely any change in aldosterone output. In patients with cardiac œdema, administration of prednisone had led to a striking loss of weight, associated with lowering of a previously high aldosterone output. Dr. Mach also referred to the suppression of aldosterone output which could be achieved by giving amphenone. Dealing with primary aldosteronism, he commented on the usual absence of œdema; but he had seen 2 patients in whom considerable œdema was associated with high output of aldosterone, there being none of the usual causes of œdema present. Investigation had shown no evidence of a tumour, and he suggested that in these 2 patients the normal responsiveness of aldosterone output to change in volume of body-fluid had been lost.

S. W. STANBURY and R. F. MAHLER discussed the interconnections of potassium deficiency and renal disease—a topic relevant to the very difficult distinction between primary aldosteronism and potassium loss due to primary renal disease. It was established that primary potassium depletion, however produced, could cause functional and morphological renal changes; while primary

renal disease of different types could give rise to potassium depletion. Potassium loss in renal disease could intensify the renal damage. Aldosterone-producing tumours caused potassium loss and so renal damage; and in renal disease salt-washing was a stimulus to aldosterone production, and so to abnormal renal loss of potassium. The practical task of sorting out these interrelated processes could be very difficult if not impossible. For example, they had had a patient with salt-losing pyelonephritis whose aldosterone output remained about ten times the normal, even although she had been maintained in sodium balance for a year before the aldosterone assays were made; this suggested that the once-stimulated adrenal might show a perverse persistence in activity, long outlasting the presumed stimulus.

E. F. SCOWEN described observations on urinary output of œstrogens after adrenalectomy in women after the menopause. There was a striking increase in œstrogen output in relation to the operation, after which œstrogen levels fell somewhat, but by no means to zero. There was little relationship apparent between œstrogen output and regression of breast cancer, and the concept of "hormone-dependent cancer" was probably an oversimplification. Other factors in urine besides œstrogens could stimulate hyperplasia in the breast, and this had been studied experimentally in male animals; one such urinary factor had been found to be under pituitary control.

C. HUGGINS and D. M. BERGENSTAL (U.S.A.) reviewed the results of total adrenalectomy in various conditions. Their experience of 278 cases gave weight to the opinion that the difficulties of maintaining the adrenalectomised patient had now been effectively overcome. High doses of cortisone and deoxycortone acetate need not be continued beyond the immediate period of operation, after which most patients could be maintained on 50 mg. of cortisone daily. A few patients developed orthostatic hypotension, which could be controlled with small doses of deoxycortone. On this maintenance programme, patients had a normal tolerance to both glucose and insulin, and a normal water diuresis. Because of the ease of maintenance, total adrenalectomy was now the operation of choice for Cushing's syndrome. In mammary cancer, total adrenalectomy, without ovariectomy, produced excellent results in many patients; but factors other than œstrogens were concerned, including progesterone. The results in Cushing's syndrome and mammary cancer were impressively documented by "before-and-after" slides. In contrast, total adrenalectomy for hypertension had been disappointing in most cases; and it was perhaps significant that where mammary cancer was complicated by hypertension, this persisted on adequate post-adrenalectomy maintenance. If mild adrenal insufficiency was allowed to develop, the blood-pressure fell.

H. P. WOLFF, K. R. KOCZOREK, and E. BUCHBORN (Germany) described their results on aldosterone excretion in 30 healthy subjects and in more than 180 patients. Increased aldosterone output was observed in all forms of œdema, the increase closely paralleling the increase in weight. There was an increased aldosterone output in acute hepatitis. About a week after myocardial infarction there was transient aldosteronism. Aldosterone output was high postoperatively, and in diabetic coma, sodium depletion, Cushing's syndrome, and 1 case of diabetes insipidus. It was normal in essential hypertension, but was sometimes increased in malignant hypertension. It was also normal in panhypopituitarism.

Bronchial Asthma and Emphysema

C. JIMÉNEZ-DIAZ (Spain) recalled that, while great progress had been made in the treatment of acute disorders, more chronic conditions such as asthma and emphysema still presented a great challenge. There was still a need for more precise definition of asthma and emphysema; and the contributions of workers trained in different disciplines might help in attaining this.

P. VALLERY-RADOT (France) spoke on the relative importance of the allergic factor in asthma. In his own series of 803 cases (370 males, 433 females), drawn from a general medical clinic, about half were mainly allergic in origin. The remainder were most commonly attributable to a primary bronchial infection, but some were due to emotional, endocrine, or digestive upsets. There was a striking relation between age and the frequency of allergy as a cause of asthma. In the first decade of life, 73% of his patients had allergy as the main cause of asthma, whereas after the age of 60 the corresponding figure was only 20%. The transition was gradual, and infection steadily displaced allergy as the common cause of asthma. In his patients the most frequent allergen was house-dust, but feathers and pollen were also common allergens.

J. GROEN, E. DEKKER, and H. E. PELZER (Holland) outlined the clinical criteria for the diagnosis of asthma, and pointed out that the ætiology of asthma was not yet sufficiently established to be useful as a basis for defining the condition. Skin tests were not sufficient evidence of an allergic cause of asthma; this could only be proved by inducing an attack on inhalation of the suspected allergen. Their results were based on inhalation tests of nebulised antigens, with serial estimations of vital capacity. They had also been able to induce asthmatic attacks by re-creating emotional situations derived from the patient's history; one patient, for example, had an asthmatic attack whenever she was shown a bowl of goldfish, while another patient was put in a lift in order to bring on an attack. While allergy and emotion were common causes of asthmatic attacks, they had found no correlation between attacks and either the bronchial microbial flora or the urinary steroid output.

They had also studied the mechanism of production of asthmatic wheezing, which they attributed to narrowing of the trachea and main bronchi, rather than to spasm of the bronchioles. They had induced asthmatic wheezes in 15 out of 17 normal people by encouraging forced expiration, with raised intrathoracic pressure. The tracheal narrowing could be shown by X rays or by bronchoscopy, and was similar in voluntary wheezing in normals, voluntary wheezing in asthmatics, and in spontaneous asthmatic attacks. Moreover, a similar change could be induced in an excised lung exposed to only 1 cm. Hg of positive pressure in a bell-jar, while "respiration" was maintained through the main bronchus. A striking film of this experiment was shown.

E. LETTERER (Germany) described the morbid anatomy of bronchial asthma. In spite of widely different ætiology, the final changes in the lungs were quite similar. Changes in the lung vessels appeared early, with engorgement and serous exudation. There was also hyalinisation and thickening of the basement membrane of the bronchioles, and an exudate whose cytology varied, but which often contained eosinophils embedded in mucus. When emphysema and bronchial infection supervened on primary asthma, there were additional morbid changes, including pulmonary arteriosclerosis secondary to hypertension.

A. COURNAND (U.S.A.) presented a detailed analysis of the relationship between altered lung function and the clinical and anatomical findings in chronic pulmonary emphysema. The main functional changes in emphysema were increase in lung volume; altered mechanics of breathing from increased viscous resistance; impaired gas exchange; diminished reactivity of the respiratory

centre leading to hypoventilation; and pulmonary vascular hypertension. Because of the tendency to hypoventilation, oxygen therapy by itself was dangerous, and must be supplemented by mechanically assisted ventilation. These changes in pulmonary function were present in varying degree in different patients, so that the clinical picture was very diverse. It was possible, however, to distinguish a number of clinical syndromes, which could be summarised thus:

1. *Clinical forms with minimal or absent bronchitic effects.*

(*a*) Generalised "atrophic" emphysema.

(*b*) Generalised emphysema complicated by a large tension air-cyst—the "vanishing lung." This might need treatment by deflation or surgical excision.

(*c*) Generalised "obstructive" emphysema. With increasing loss of elastic fibres the lumen of the bronchioles might collapse and trap air in visible cysts and bullæ. Even in the absence of bronchitis, emphysema could cause death from anoxæmia, CO_2 retention, or cardiac failure.

2. *Clinical forms with moderate or severe bronchitis.*—It was in this group that antibiotic and antispasmodic treatment was of considerable value.

3. *Clinical forms with predominant bronchial manifestations and only minimal emphysema.*—"Although not frequent, these cases are not exceptional." The clinical appearance was that of *Cardiacos negros*, and there was a combination of severe ventilatory insufficiency, large venous admixture, CO_2 retention, polycythæmia, and high-output failure.

P. H. ROSSIER (Switzerland) claimed that the essential feature of emphysema was a loss of normal elasticity, so that the lung tends to retain throughout the respiratory cycle something close to its normal inspiratory volume, with consequent increase of residual air. Although estimates of lung elasticity sometimes showed an increase, this was an artefact from loss of homogeneity in the lung, due to "trapping" of air by bronchial compression. The increase in the air in the lung might be regarded as "helpful" in increasing lung elasticity; but any such benefit had to be paid for in diminished efficiency of gaseous exchange.

W. LÖFFLER (Switzerland) commented on the increased frequency of emphysema, which was partly related to the higher proportion of older people in the population. In treatment, he had found the cardiac glucosides effective in cor pulmonale. He had also had good results with acetazolamide ('Diamox') in selected patients; and also with steroids when there was complicating bronchospasm.

A. VANNOTTI and B. BAUDRAZ (Switzerland) described the place of mechanical ventilation in the treatment of emphysema. Simple oxygen therapy could exaggerate the acidosis by permitting further retention of CO_2, and the acidosis might be further aggravated when acetazolamide had been given, increasing urinary output of bicarbonate. Salicylate could be used to increase respiration, but side-effects made adequate dosage impracticable. For these reasons, they had studied mechanical assistance to respiration in emphysematous subjects. Passive hyperventilation could get rid of excess CO_2, and restore normal sensitivity of the respiratory centre. There was also a fall in pulmonary arteriolar resistance, and bicarbonate excretion in the urine increased, showing that the acidosis had been corrected. Usually assisted respiration need not be continuous but could be given for one to two hours each day for several weeks; but in the worst cases almost continuous assisted respiration was needed. It could be given by an iron lung, by a cuirass, or by Engström's apparatus. Patients apparently doomed had been enabled to live an almost normal life for up to two years (the duration of follow-up).

B. ROSE (Canada) had studied the cardiopulmonary responses to injections of methacholine ('Mecholyl') and histamine, and to inhalations of pollen aerosols, in 30 asthmatics and in 6 healthy students. Vital capacity and maximal breathing capacity, and arterial and pulmonary-artery pressures, had been measured. In simple asthma, the changes in pulmonary-arterial pressures were related to the alterations in intrathoracic pressure during the attack; whereas in emphysema there was a sustained increase in pulmonary-artery pressures. Patients with the changes of simple asthma, such as bronchospasm and transient œdema, responded to steroid therapy; whereas symptoms due to emphysema did not respond to steroid therapy.

W. MELVILLE ARNOTT stressed the importance of increased airway resistance in "trapping" air and in increasing the work of expiration. Physiologically, the emphysema syndrome was due to alveolar underventilation as a result of airway obstruction. "We are therefore within sight of a rational concept of emphysema reasonably secure in its physiological support but somewhat tentative in the links between functional and structural change." An important objective in treatment was to reduce bronchial obstruction by removing irritants, curbing infection, controlling spasm, dispelling mucus, and correcting alveolar underventilation.

Other Communications

Over 300 communications were given in five lecture-theatres.

HYPOGLYCÆMIA

F. N. ALLAN (U.S.A.) reviewed the experience of the Lahey clinic in the management of hyperinsulinism, and of hypoglycæmia in general. The outstanding practical problem was to decide which cases were probably due to an islet tumour, and so were amenable to surgery.

ELECTROLYTE DISTURBANCE IN PYLORIC STENOSIS

D. A. K. BLACK described the rôle of potassium depletion in causing the extracellular alkalosis often found in patients with pyloric stenosis. He recommended treatment with alkaline salts of potassium by mouth and criticised the use of ammonium chloride.

ENZYMES IN PREGNANCY

O. FITZGERALD (Eire) had observed serum amylase and lipase levels during pregnancy. There was no change in lipase, but amylase fell in the middle trimester, rising again around term to levels which commonly exceeded the normal. The low figures in mid-pregnancy might be related to general malaise, while the high figures at term might be associated with the occasional development of acute obstructive pancreatitis.

DIET IN OBESITY

A. KEKWICK described his observations on the weight reduction attained by feeding high-fat and high-protein diets, as compared with isocaloric high-carbohydrate diets. The reducing effect of high-fat diets was not due to ketosis, or to faulty fat absorption; some evidence of an increase in metabolism was obtained in the form of high insensible water-loss and raised oxygen-uptake.

TOXIC EFFECTS OF FLUORIDATED WATER

G. L. WALDBOTT (U.S.A.) described toxic effects which he had observed in association with the use of fluoridated water. The chief manifestations were arthritic spinal changes, paræsthesiæ, stomatitis and gastro-intestinal irritation, malaise, visual disturbances, and brittle nails. These were associated with a considerable increase in urinary output of calcium; and a test-dose of fluoride had caused reactivation of symptoms, and an increased urinary calcium output, in a susceptible subject. The bone and teeth changes of advanced fluorosis had not been observed in these patients.

HÆMATOLOGY

THE International Society of Hematology met for its 1956 congress in Boston, Mass., on Aug. 27–Sept. 1, under the presidency of Dr. W. DAMESHEK. There were more than 800 scientific contributions. Each morning was devoted to a plenary session at which distinguished speakers surveyed developments in a particular field. In the afternoons simultaneous sessions and panel discussions developed the theme. In view of the size of the meeting there were few spontaneous discussions, but the congress was admirably organised.

The first day was devoted to leukæmia, when the main topics were the incidence and ætiology of leukæmia, the metabolism of leucocytes, and therapy. Prof. G. DI GUGLIELMO (Rome) spoke on acute erythræmic myelosis (Guglielmo's disease). It seems that the condition is by no means as rare as had been thought when it was first described. Dr. K. HAUSMANN (Hamburg) reported that at the St. Georg General Hospital in Hamburg necropsies with leukæmic disorders had numbered 10·5 per 1000 in 1930–1939 and 21·6 per 1000 in 1945–1954. Therapeutic and professional exposure to X rays, to petrol and its derivatives, and to carcinogenic hydrocarbons was responsible for about 25% of the cases. It had been possible to observe in 26 cases the development of a primary focus of lymphatic leukæmia in chronically irritated tissue; the latent period varied from 2 to 27 years. Dr. B. MACMAHON and Dr. E. KOLLER (New York) found a higher rate of leukæmia in some ethnic groups in the United States than in others. It is unlikely that these differences can be explained by genetic factors; they are probably due to differences in the completeness of diagnosis, X-ray exposure, diet, and occupation. Dr. W. H. CROSBY and Dr. R. D. LANGE found that, in 14 consecutive patients with chronic myeloid leukæmia, the 7 women required on the average only 20 μc. of P^{32} per kg. body-weight to control the disease, whereas the men needed 83 μc. There was no overlap between the two groups; the woman requiring the largest dose had 35 μc., and the man who got the smallest dose received 50 μc.

Next day a number of lecturers summarised progress in nucleonics in the past few years. New applications of isotope technique included the use of labelled red cells to study incompatibility (Dr. P. L. MOLLISON, London), and the measurement of platelet survival by labelling them with Cr^{51} (Dr. E. H. REISNER and others, New York) or with P^{32} (Dr. A. ADELSON and Dr. J. J. RHEINGOLD, Washington, D.C.) or by incorporating C^{14}-formate, S^{35}-methionine, and P^{32}-labelled di-isopropylfluorophosphate (Dr. T. T. ODELL, Oakridge, Tennessee).

Dr. J. WALDENSTRÖM (Malmö, Sweden) discussed dysproteinæmic conditions—hypergammaglobulinæmia, myeloma, and macroglobulinæmia. He suggested that myeloma and the other systemic diseases caused an increased synthesis of one or a limited number of members in the "gamma family," whereas hypergammaglobulinæmia in collagen diseases and in cirrhosis of the liver was caused by a large number of different gammaglobulins.

It was very noticeable that work on hæmophilia, platelet factors, and fibrinolysis was primarily biochemical and that the methods involved had become remote from what is usually understood as hæmatological technique. Dr. K. W. WALTON and Dr. H. A. ELLIS (Birmingham, England) had succeeded in separating antihæmophilic globulin from fibrinogen. Dr. M. J. LAURRIEU, Dr. D. ALAGILLE, and Dr. J. SOULIER (Paris) described 2 patients, one with plasma-thromboplastin accelerator (P.T.A.) deficiency and the other with Spaet's factor-IV deficiency. The plasma deficiencies of these two patients were not mutually corrective, nor were they corrected by a plasma definitely lacking P.T.A. This failure or absence of mutual correction illustrates the difficulties surrounding the 4th thromboplastic factor, and the need to use fresh and not frozen plasma to test corrections.

During the day devoted to anæmia, the contributions included a thirty years' report on pernicious anæmia by Dr. W. B. CASTLE (Boston, Mass.). Dr. J. N. MARSHALL CHALMERS (Birmingham, England) gave an interesting account of pure red-cell anæmia in patients with tumours of the thymus. In the ensuing discussion many more examples of this disorder were mentioned. Dr. L. W. DIGGS (Memphis, Tennessee) showed slides and colour photographs demonstrating the tissue damage due to intravascular sickling in sickle-cell heterozygotes. Renal damage, which is a well-known complication in homozygotes with sickle-cell anæmia, is also not uncommon in the heterozygous carriers of the sickle-cell trait. Dr. G. A. ALEXEIEFF (Moscow) described the results of splenectomy in congenital hæmolytic icterus with spherocytes. Removal of the spleen radically altered the course of the disease although the erythrocytes remained abnormal and retained their "hæmolytic readiness."

There were several papers on the heat-stable erythropoietic factor found in the plasma of animals made anæmic by bleeding (Dr. J. W. LINMAN and Dr. F. H. BETHELL, Ann Arbor, Michigan; Dr. W. A. RAMBACH, Dr. J. A. D. COOPER, and Dr. H. L. ALT, Chicago) and on the humoral effects on blood formation, seen particularly after hypophysectomy. A group of workers from Berkeley, California, including Dr. D. C. VAN DYKE and Dr. J. H. LAWRENCE, had prepared active erythropoietic fractions from sheep pituitary, which corrected the anæmias in hypophysectomised, thyroidectomised, orchidectomised, or adrenalectomised rats, and which in normal rats produced polycythæmia.

The last day of the congress was also the first of that of the International Society of Blood Transfusion, and was devoted to hæmolytic anæmias and immunohæmatology.

The next congress is planned for Rome in 1958, under the presidency of Professor Guglielmo.

Medicine and the Law

New N.H.S. Regulations

THE Minister of Health has made new regulations governing the jurisdiction and procedure of service committees and the N.H.S. Tribunal.[1] The regulations, which come into force on Oct. 1, revoke and consolidate the existing regulations [2] and make some important changes.

Complaint against a Deputy

The changes include a new procedure for dealing with cases where a complaint is made against a deputy to a general medical practitioner. The new regulations retain the general position that practitioners are responsible for their agents, including their paid employees, professional assistants, and locum tenentes, and professional colleagues acting as deputies. Special provision has now been made, however, for dealing with cases where the deputy is a practitioner in the same medical list as the principal and who could not therefore be regarded as being under the control of the principal. In such cases, where a complaint is made against the principal in respect of the acts or omissions of the deputy, the complaint will be deemed to have been made against both practitioners. The same rule will apply where the complaint is made

1. National Health Service (Service Committees and Tribunal) Regulations, 1956, S.I. 1956, no. 1077.
2. S.I. 1948, no. 507; S.I. 1950, no. 983.; S.I. 1953, no. 1175.

against the deputy. The medical service committee, however, may dismiss the case against the principal without a hearing, if the chairman considers that there are no prima-facie grounds of complaint against the principal personally, and he has carried out his obligation to make all proper and necessary deputising arrangements.

Investigation of N.H.S. Complaints

The N.H.S. (Service Committees and Tribunal) Regulations, 1948, required the appropriate service committee to investigate any complaint against a practitioner in respect of an alleged failure to comply with the terms of service—subject only to the complaint having been made in due time and in the proper form. Normally such complaints have been made on behalf of a patient or have been supported by him, but in a few cases complaints have been made without the support of the patient and by persons without any title to speak for him.

The Minister evidently considers that this general right of complaint is unnecessary. Under the new regulations which come into force on Oct. 1, the jurisdiction of the service committees will be limited to:

(1) Complaints by (*a*) the patient; (*b*) the patient's spouse; (*c*) a person so authorised by the patient; (*d*) a person acting on behalf of a patient who is incapable of making a complaint by reason of old age, sickness, or other infirmity; (*e*) a person acting on behalf of a patient under the age of 18.

(2) Complaints by any person in relation to the death of a patient.

(3) Complaints by the Ministry of Pensions and National Insurance or the Dental Estimates Board.

(4) Cases referred by the executive council under regulation 4(5).

Except in case (4), the chairman of the service committee must be satisfied that the complaint has been made by a person or body entitled to complain. If it emerges after the hearing has begun that the complaint was not so made, the hearing is to continue and will be deemed to have been referred to the committee under regulation 4(5).

These new restrictions do not prevent other people from drawing the attention of the executive council to any case in which they think that there has been a breach of the terms of service. It will then be for the council to refer the matter to the appropriate service committee, if it thinks fit.

Public Health

A NOTE ON THE DISINFECTION OF BATHS AND BASINS

J. A. BOYCOTT
D.M. Oxfd
DIRECTOR OF THE PUBLIC HEALTH LABORATORY, TAUNTON

IT is generally true that when a person has washed himself he leaves, apart from dirt in suspension in the water, a coloured greasy "waterline" round the bath or basin. The removal of this waterline entails hard rubbing with or without an abrasive powder or a wetting agent. Microscopical examination of the deposit shows amorphous debris containing a few epithelial cells and bacteria. Most of this organic matter is presumably derived from the skin with contributions from the respiratory tract and the anus. Bacteriological culture of twenty such deposits taken at random from the bath in a female ward showed viable bacteria in all—coliform bacilli, micrococci, *Staphylococcus aureus*, *Streptococcus fæcalis*, and *Neisseria spp.* Samples of bath water gave presumptive coli counts ranging from 0 to 1800+ per 100 ml.

Common experience suggests that the risk of spreading infectious disease by this route among healthy people is small. In hospitals, however, a large number of the inmates are carriers of potentially pathogenic bacteria or especially susceptible to infection, and in some circumstances every possible route of cross-infection must be blocked in so far as this is possible. As far as I know, baths and basins have not been incriminated as a major source of infection; but on one occasion the incidence of superficial staphylococcal infections in infants was much reduced when the practice of washing them in a common basin was abandoned.

The committee on cross-infection in hospitals appointed by the Medical Research Council, recommended cetrimide ('Cetavlon') or undiluted 'Lysol' for the disinfection of baths.[1,2] No mention is made of cleaning, although it is an axiom that cleaning is a necessary preliminary or accompaniment to disinfection. Cetavlon is itself detergent, but because it is inactivated by soap and other anionic detergents it should be used only after preliminary washing of the bath. Undiluted lysol should not touch the naked hand: it will therefore be used gingerly and it is unlikely that it will always be applied diligently over the whole surface of the bath. The more recent "Manual of Nursing Procedures" issued by the Ministry of Health advises "adequate cleaning" followed by lysol 1 in 20.[3] Although no evidence that this process is effective is available, it seems on the face of it safe and likely to be successful. There are no doubt other methods in use which have not been made public, and most hospitals probably rely upon thorough cleaning without the use of any specific disinfectant.

The Milk and Dairies Regulations, 1949, allow chemical disinfection as an alternative to the sterilisation of dairy utensils by steam.[4] The essential provision of the recommended method is the use of a hot detergent wash containing 1 part in 320 of an "approved hypochlorite." An approved hypochlorite must contain 9–12% available chlorine, not less than 0·7% sodium chlorate, and not more than 2% free caustic alkali. Because the surface of a bath is similar to that of a milk-churn, and because the active ingredient of this method is cheap and harmless, it occurred to me that some modification of this method might be useful for disinfecting baths and basins.

EXPERIMENTAL

Autoclaved human fæces, soap solution, and broth cultures of *Bacterium coli* and *Strep. fæcalis* were well mixed in a laboratory sink half full of warm water. After standing for 15 minutes this mixture produced a fair simulacrum of a dirty bath. The sink was emptied, disinfected by one of several methods, and, after swilling with cold water, refilled with warm water. The bacterial content of this water after standing for 30 minutes was thought to give a reasonable measure of the success of disinfection. It was not possible to be sure that every trace of disinfectant had been removed before the last filling; but, since the same conditions will occur in practice, this did not seem of great importance.

The following methods of disinfection were tried:

1. About a tenth of the effective capacity of the sink was filled with warm water from the tap. To this was added 0·3% 'Chloros' (an "approved hypochlorite") and 0·3% liquid detergent. The sink was rinsed thoroughly using a large cotton-wool swab.

1. Control of Cross Infection in Hospitals. Medical Research Council Memorandum No. 11. (Revised edition 1951.) H.M. Stationery Office.
2. Barnes, J. M. *Lancet*, 1942, i, 531.
3. Manual of Nursing Procedures. Ministry of Health Memorandum N.P. IV, par. 2.
4. Milk and Dairies Regulations, 1949. S.I.1949, no. 1588. Part IX, par. 26. H.M. Stationery Office.

2–5. The whole internal surface of the sink was rubbed with a large swab soaked in one of these disinfectants :

2. Cetavlon, 1/100.
3. Lysol, 1/60.
4. 'Izal,' 1/60 (a "white fluid").
5. B.H.C. 238, 1/40 (a quaternary ammonium compound).

6. Undiluted lysol was rubbed over the internal surface of the sink. Because it could not be touched by hand, the amount of lysol on the swab was small and frequently renewed. Used conscientiously, this process took a long time and it was impossible to be sure that the whole surface had been covered.

Estimation of the bacterial content of the final filling showed that all these processes except no. 6 reduced the numbers from about 20,000 per ml. to less than 500 per ml. Quite often no organisms were recovered. Undiluted lysol gave inconsistent results. There is probably little to choose between the other methods of disinfection but some are cheaper and some easier than others.

PRACTICE

Because it allows washing and disinfection to be combined in one process, the hot detergent hypochlorite rinse (method no. 1 supra) was chosen for trial under working conditions in a female ward. After some modifications the method used was as follows :

1. The water, as hot as can be borne by the naked hand, is run into the bath to between a twentieth and a tenth of its effective content (1–2 gallons).

2. To this is added $^1/_2$ fl. oz. of an approved hypochlorite, and detergent sufficient for cleaning purposes. Several brands of commercial detergent, both liquid and solid, have been tried and none has been unsatisfactory. Because some detergents cause a release of chlorine, the hypochlorite and detergent should not be mixed before use.

3. The bath is washed thoroughly with a clean cloth kept for this purpose only.

4. The rinse is allowed to drain out. Subsequent washing with tap water is unnecessary unless there is gross dirt left loose in the bath or unless excess of detergent has made the bath slippery.

The method has been liked by the sister in charge of the ward and by the wardmaids who use it. The rather sanitary smell of chlorine which hangs about the bathroom is not unpopular. The method has also been used in basins used for bathing infants, without any proven disadvantages.

SUMMARY

A hot detergent hypochlorite rinse is a simple and cheap method of disinfecting baths and basins.

The process makes preliminary cleaning unnecessary (unless the bath is grossly dirty) and appears to be as effective as any other which has been suggested for this purpose.

My thanks are due to Newton, Chambers, & Co. and to the British Hydrological Corporation for advice, and to the latter for the gift of B.H.C. 238 ; and to the nursing staff of Musgrove Park Hospital, Taunton, for their helpful coöperation.

Research on Smoking Habits

Addressing the Royal Sanitary Association at Montrose on Sept. 20, Dr. J. N. Morris, director of the Medical Research Council's social medicine research unit, suggested that the fact that the Ministry of Health was apparently not intending to do very much to discourage smoking was a challenge, in the best British tradition, to others to get on with the job. This challenge lay particularly at the door of the medical officer of health, who might usefully do several things. First, he might make an epidemiological study of smoking habits in his parish—our ignorance of these habits was profound. Then, what people know about the cancer-smoking researches might be assessed locally, and this assessment followed by health education programmes in coöperation with clinicians. The results of these programmes might be compared in such terms as the numbers who had given up smoking and the proportion of teenagers starting smoking. The changes in other habits consequent on change in the smoking habit could also be investigated. A national publicity campaign to discourage people from smoking was not being started ; but meanwhile the public was exposed to a tremendous publicity campaign, costing vast sums of money, encouraging people to smoke. "This whole problem raises the gravest issues of social policy."

Unemployed in Aberdeen

Nowadays the unemployed comprise some 1% of the insured population in England and over 2% in Scotland. Dr. I. M. Richardson remarks, in an account of 200 unemployed men in Aberdeen,[1] that unemployment may demoralise not only the unemployed person but his family—effects which, he says, "may well be passed from one generation to the next and thus perpetuate a social sickness at least some of which might be prevented if the factors associated with unemployment could be isolated and examined."

Richardson took a random sample of men, aged 30 or over, who had been unemployed for a month or longer, of whom 77% (200 in all) agreed to be interviewed and are included in his survey.

91 of these 200 men had a substantial physical handicap, but only 49 (54%) were registered as disabled. The commonest physical handicaps were bronchitis, backache, angina, peptic ulcer, osteo-arthritis, and the effects of injury. In addition, 15 men showed gross signs of mental illness, though none was under treatment ; and a further 11 were clearly mentally deficient.

Age, fitness, attitude to work, and social class were found to be major factors associated with unemployment ; 30% of the sample had a poor attitude in that their sense of social responsibility was apparently deficient.

"A poor attitude to employment could be either a cause or an effect of long unemployment. . . . Impressions from the interviews sometimes suggested that there had never been a strong inclination for work ; much more frequently the impression left was that initially the individual had made sound efforts to find work but repeated failures had led to discouragement and the gradual appearance of a hopeless resignation."

Despite the machinery created by the 1944 Disabled Persons Employment Act, the lot of a small proportion of disabled men is still an unhappy one.

"Since disability is by itself an important correlate of unemployment there is a good case for greater attention to it, at least in areas such as Aberdeen where full employment does not exist. The solution appears to lie in an extension of training facilities but this must depend on accurate assessment of the capacity to profit from skilled vocational training."

Richardson concludes that our concept of disability is still shadowy. It could, he says, be argued that the problem of the unemployed is largely a problem of mental and physical disability, assuming that the term disability includes the distorted social attitudes so commonly found. But whereas physical handicap evokes the public's compassion, emotional handicap is regarded as somehow implying deficient will-power and sense of responsibility.

The Second Quarter

The Registrar-General's return for the June quarter in England and Wales has now been published.[2] The main figures for births and deaths in that quarter have been published previously.[3] An appendix giving some provisional figures of causes of death in 1955 by sex and age shows that of the record low figure of 88 deaths from whooping-cough, 60 were of children under one year of age ; 613 children (396 boys and 217 girls) under 15 years of age were killed in motor-vehicle accidents ; other accidents caused the deaths of 879 boys and 485 girls under 15 (322 of the boys and 220 of the girls were under one year of age).

1. *Med. Offr*, Sept. 14, 1956, p. 165.
2. Registrar-General's Quarterly Return no. 430. H.M. Stationery Office. Pp. 24. 1s. 6d.
3. See *Lancet*, July 28, 1956, p. 206.

In England Now

A Running Commentary by Peripatetic Correspondents

A GOOD name is rather to be chosen than great riches. The Sanitary Inspectors have paused in their perennial economic jousts with the Whitley Council to raise by royal assent the banner of their new title as Public Health Inspectors. It took a generous share of luck to secure the blessing of a working party and the hazardous procedure of a Private Member's Bill, the good fortune to slip through the list late on a Friday afternoon, to scrape over the quorum agonies of the committee stage, and to survive some vigorous last-minute opposition at the third reading. But the title deserves a fanfare of welcome in its own right.

As inspectors of nuisances, then sanitary inspectors, and now public-health inspectors, the same enthusiastic fraternity continue their century's march on the right hand of the medical officers of health to meet the changing fortunes of our times, and the ever-changing meaning of our English language. Just as vital statistics, the traditional term of art of births and deaths, has recently curved towards popular use for the bust, waist, and hip dimensions of female pulchritude, so the designation sanitary has come to suggest chronic preoccupation round the bend. It now remains for someone to devise a euphemism for the inspector part of the title, to reflect the modern educational positive approach which so often wins better results from the contrary British public than the hackle-raising suspicion of enforcement. Anyway it will take a generation for the gentleman in the avenue to forget the rat-catcher, the bin-man, the cruelty-man, and the nuisance-man. For the more junior minions Third Additional Public Health Inspector sounds a bit of a mouthful, but given time we shall swallow it for the greater good. Having fought off encroachment by the vets and absorption by the surveyors, the public-health inspectors have been reaffirmed securely in their place as invaluable members of the medical officer of health's staff. They may not yet be free of the danger of dilution, but if the change of title helps them, inspires them, and encourages recruitment—Good luck to the Public Health Inspectors of England and Wales.

* * *

My young friend came to me last night with a rather tricky problem. How could he make his mark in medicine by Jan. 10, he asked. I inquired why then, and it turned out that he is getting married then and wouldn't have the time afterwards.

I asked for further details. Had he discovered any new disease? No, he said, not even a measly syndrome. How about a new drug, or a missing factor in a disease no-one had ever heard of? No again, he said, he couldn't remember having discovered anything like that lately. Very well then, I said, let's think of some titles and perhaps you can think of a disease to fit them. How about Hogmanay disease or a dermatological rash involving the skin or the Bolus No. 9 disease? My young friend shook his head sadly, like a membership censor enjoying himself.

I was struck by an inspiration. Have you written an article? I asked. No, he replied. I was surprised—after all he had been qualified four months. In that case, I said, there is only one thing left to do if you want to make your mark in medicine by Jan. 10 and that is to write an article. My young friend protested. He had nothing to say, he said. Why should you be different from the others? I asked. He was moved by my logic. What subject should he write about? So far, he has only done locum surgeries at Shepherd's Bush. Excellent, I exclaimed, you must write an article on medical education. Call it *Thoughts from a Surgery in Shepherd's Bush*.

Will that suffice? he asked. Assuredly, I said. Make a few nasty noises about the medical curriculum and say that anatomy and physiology should be scrapped and that clinical work should start in the first year. Insist that consultants should be apprenticed to G.P.s for at least a year and then not allowed back into their wards at all. Will anyone take it? he said. Take it, I exclaimed, they'll clamour for it. All they have just now are articles on serum levels in aboriginal half-castes in Outer Bessarabia, besides they are always printing articles on medical education.

And will that make my name in medicine by Jan. 10th? my young friend said. Certainly, I said, and not only that—the correspondence that follows will keep your name aglow for at least a year.

* * *

Those who work in the hospitals of the great cities and try to practise scientific medicine have little idea of the amount of old wives' medicine which still exists. The miraculous disappearance of warts is well known but I heard lately of another miracle.

An old friend of mine has suffered for many years from much irritation of the face and ears. This was diagnosed as lupus erythematosus and was treated with some success with mepacrine. Recently he developed many blotches on the skin of his face and chest which irritated greatly and did not yield to the treatment given by his doctor. One afternoon he visited his old gardener who lived in a small village in Cornwall. The old man urged him to visit an old woman who had a great reputation as a charmer. She lived in a tiny cottage and having heard about my friends' trouble asked for some article of his clothing. She was given a silk handkerchief and spreading this over her knees proceeded to rub it hard saying that the "fluencies" were produced in this way. She treated a linen handkerchief in the same way and the "fluencing" took about twenty minutes. She told him to wrap the silk handkerchief round his head when he went to bed and the linen one round his chest and to keep them on all night. A fee was not demanded but the sum of five shillings was tendered and accepted. My friend noticed some dozen parcels neatly packed up and was told that these contained articles of clothing which had been sent to be "fluenced" and would be posted back that afternoon. My friend wrapped up his head and chest as directed saying at the same time what a fool he was to do such silly things. But the proof of the pudding is in the eating and in ten days the blotches and irritation had completely disappeared.

However, the experiment is not convincing since on the very morning of the day he visited the charmer, his doctor had brought a skin specialist to see him. After a careful history had been taken and the skin inspected the specialist had diagnosed the condition as a drug rash caused by taking a barbiturate. He advised stopping the barbiturate and expressed the belief that the condition would soon clear up. My friend gave up the barbiturate and remains in some doubt whether to attribute his recovery to this advice or to the "fluencies" induced by the rubbing of the handkerchiefs by the charmer.

* * *

Trevor, aged 3½, is proud of his new-found ability to separate plums from their stones. The stones were duly marshalled for a visiting aunt to proclaim his fortune. "Tinker, tailor, soldier, sailor, rich man . . ." "There, Trevor, you will be a rich man when you grow up!" The reply was firm: "Oh, NO! I'm going to be a Doctor like Daddy."

* * *

ONCE AGAIN—NOTHING NEW
or
The Swiss have pioneered in more than Cuckoo Clocks

When schizophrenes lose a piece of brain
Statistics say (and they say it plain)
For every three that behind remain
There's one gets up and goes home again.

When Burckhardt heard of the work of Goltz
He opened four patients' cranial vaults,
Removed some brain—awaited results—
There was one for whom he drew back the bolts.

Great is our Century, simply great!
Its Progress is wonderful to relate!
(Did I not mention Burckhardt's date?
It was Eighteen Hundred
And Eighty
Eight.)

Letters to the Editor

THE FINAL EXAMINATION

SIR,—The upheaval of holidays and international conferences has delayed my reaction time to the debate on this subject. As one of Professor Bull's associates—or should I say guineapigs?—in experiments on the "final," may I make a few comments?

Everything the critics have said is perfectly correct, and as examiners we have been aware of all the points. The published statistical analysis gives the bald data, but it should not be thought that multiple-choice questions made up the whole final examination. Questions of the "essay" type were set in a second paper. Further experiments leading to complete freedom of choice of topic, such as "Discuss advances in treatment which have taken place in the last ten years in any disorder you choose," have led to equally interesting results. With such free choice the candidates are just as readily and easily sorted out into good, bad, and indifferent as by the rigidly restricted choice of topic like "measles" or "ulcerative colitis." A great advantage of inviting discussion of a subject *in depth* rather than a superficial scamper through a variety of fixed topics, each usually too long to be answered properly in the allotted time, is that it encourages real interest in today's problems of medicine. Before completing my term as examiner in Belfast I thought I could perceive a distinct awakening of student interest which may have resulted at least in part from a change in the form of examination.

As examiners, we have a heavy responsibility not only to the university but also to the public. The writing of English is important, but powers of logical assembly and deduction, technique of physical examination, the interpretation of physical signs, familiarity with the common disease processes, personality, bedside performance and manners, and ability to enter into discussion are all to be judged. It is often very hard to be fair in the clinical part of the examination, which may vary so enormously in ease or difficulty of reaching a diagnosis, but two long written papers totalling eight questions become so boring and exhausting that attention flags and the wrong mark may be given.

Professor Bull's boldness has made the examiner's task easier, the judgment fairer, and the results more satisfying than any other system I know; and planning questions for the multiple-choice paper is a much more stimulating task than spending long weary hours in the monotonous job of arranging answers on "measles" in an order of merit.

Postgraduate Medical School,
London, W.12. JOHN MCMICHAEL.

THE ALMONER

SIR,—Fifty years of working with almoners, and a considerable acquaintance with the work and aims of the Council of the Institute of Almoners perhaps entitle me to comment on your leading article of Sept. 15.

Nobody is more conscious of the need to work with the medical profession than that Council. Indeed they are at this moment proposing to ask the Royal College of Physicians to facilitate joint discussion between themselves and the profession.

Nobody could more heartily agree with your concluding sentence: "The whole patient is apt to need the whole team." It is precisely as an acknowledged member of the team that they wish to work.

If there be, as you say, hostility between hospital staffs and almoners, which I am very sorry to hear, there is perhaps some historical explanation of it. Almoners over many years before the last war were forced, in the voluntary hospitals, into a position which they deplored and, I think I may say, resented. The tasks then imposed no longer fall to their lot but many are still asked to perform duties which could be as well and more economically done by people with a much shorter and less intensive training. On the one explanatory point you raise "jealousy in guarding their information" it derives, if it really exists, from the promise of "confidence" often given of necessity if it is to be obtained. Perhaps not enough care has always been devoted to the terms in which a promise not to disclose has been given. When disclosure is limited to the medical team who need it for the very purpose of relieving the anxiety or emotional entanglement which underlies ill health, it should seldom be impossible for the trained almoner to secure as much "secret" information for the heads of "the team" as for herself alone.

If there be other reasons for hostility it should be possible to ascertain and eliminate them when the proposed discussions take place.

London, W.1. E. ROCK CARLING.

SIR,—In your editorial you mentioned "Charcot-Marie-Tooth disease" and referred to it later as a young man with a "stiff back." I am sure that you must be confusing that disease (peroneal muscular atrophy) with "Marie-Strümpell disease," which is ankylosing spondylitis.

May I again appeal against the use of such names at all? Surely we do not need them to remind us of the greatness of Charcot, or his distinguished pupil Pierre Marie. As for the others—well, for a long time I thought Marie Strümpell was a foreign woman.

Westminster Medical School,
London, S.W.2. ELLIS DOUEK.

THE FAMILIAL INCIDENCE OF LOW PSEUDOCHOLINESTERASE LEVEL

SIR,—Dr. Allott and Mr. Thompson (Sept. 8) and Dr. Kalow (Sept. 15) have stated that they also have seen low pseudocholinesterase levels which seemed to be of a genetic rather than an acquired type.

Our observations (July 21) supported the possibility that the low pseudocholinesterase level was seen in homozygotes for a gene which had no effect in the heterozygous state—i.e., was recessive. Both the other communications suggest that the heterozygous state too may result in a phenotype with a lowered pseudocholinesterase level. There is no real contradiction; truly recessive genes—i.e., recessive genes which never have any penetrance in the heterozygote—are almost unknown. Assuming that there are only two alleles (which is, of course, by no means yet established)—one responsible for a normal and one for a low enzyme level—one can well imagine that the heterozygous state could result in wide variations observable as normal, diminished, or grossly diminished concentration of pseudocholinesterase in the serum.

For example, in thalassæmia where a gene suppresses formation of normal adult hæmoglobin (A), the homozygote invariably shows anæmia and on the whole the heterozygote does not. Nevertheless penetrance of the single thalassæmia gene in the heterozygous state can occasionally be so variable that in the same family some heterozygotes cannot be distinguished from normal homozygotes, others are mildly, and yet others more severely anæmic, and sometimes one may be found in whom clinical and laboratory observations are identical with those one is used to obtain when examining affected homozygotes (thalassæmia major). In extreme cases only family study can distinguish the heterozygote from the normal or the abnormal homozygote.

In addition to the two letters you have published, we have received a number of personal communications, and it might be helpful to remind those who are studying

a possible genetic background of low pseudocholinesterase level that malnutrition can be responsible for this phenomenon even in the absence of obvious liver damage, and that malnutrition can affect whole families. The reverse also holds: pseudocholinesterase levels tend to be raised in obesity [1]; observations have been recorded on an occasional rise in toxic goitre; and we have seen very high levels associated with alcoholism, pancreatitis and insulinoma. In these latter cases it is possible that enzyme enters the circulation from damaged tissues which are rich in pseudocholinesterase but which normally do not contribute to the pool of circulating enzyme.

St. Bartholomew's Hospital, London, E.C.1. H. LEHMANN
E. RYAN.

DEAF OR BACKWARD ?

SIR,—Dr. Dunham in his letter last week states that your conclusion that where behaviour problems occur "there is yet no means of making a satisfactory diagnosis" seems unnecessarily gloomy. He then points out that mental deficiency may be detectable in delay in motor development (including delay in reaching the traditional milestones). It is because in the past children have been diagnosed as being mentally defective, and largely owing to this delay, that the Research Unit for Deaf Children was set up in this hospital.

The children are deaf, have no speech, and to all intents and purposes appear defective, and it is only after months of observation and testing that one is able to decide whether the child is in fact defective or deaf, or a combination of both. It is obvious that a number of these children are subnormal mentally, but it is our duty to decide to what extent they are educable so that they are not cast into mental defective institutions without being given a proper chance in life.

Many of these children who have passed through our hands, and have been referred for opinions, have been sent as straightforward defectives, but we have been able to show that many are capable of education at deaf and other special schools, and we hope will ultimately prove themselves useful citizens within their limitations.

Belmont Hospital, Sutton, Surrey. LOUIS MINSKI.

BILIGRAFIN FOR HYSTEROSALPINGOGRAPHY

SIR,—At the end of 1955, one of us published an article illustrating hysterosalpingography by means of 'Viskiosol–6.' [2] Soon afterwards the manufacturers withdrew this product because evidence had been produced in America that the polyvinylpyrrolidone contained in it may have a carcinogenic action.

In an attempt to find a suitable replacement water-soluble medium 'Biligrafin Forte' (Schering) has been used, and we are able to review 51 cases using the following criteria [3]: (1) adequate opacity, (2) adequate viscosity, (3) absorbability, (4) non-irritability.

1. *Opacity.*—Biligrafin forte (50%) is seen easily on the screen, and radiographs of good contrast are obtained under identical conditions to those under which viskiosol–6 was used.

2. *Viscosity.*—Biligrafin is easy to use, and although of low viscosity it has been very adequate as obturation has been simple and satisfactory in all cases.

3. *Absorption.*—This compares favourably with viskiosol–6, the medium appearing in the urinary tract and outlining the bladder within thirty minutes. In 5 cases of hydrosalpinx, the medium persisted in the loculus and yielded a very good delayed film.[4]

4. *Non-irritability.*—Discomfort after examination has been absent; and no severe pain or nausea or vomiting has been associated with peritoneal spill. There have been no general or local reactions, though we have not used this medium in a case of proved pelvic tuberculosis.

Biligrafin forte thus compares favourably with viskiosol–6, and in 5 cases where hysterosalpingography had been performed previously with viskiosol–6 the uterine and tubal shadows were equally satisfactory. The series is to be continued using biligrafin 30%.

Bristol. W. G. MACGREGOR
J. M. SHEACH.

1. Thompson, R. H. S., Trounce, J. R. *Lancet*, 1956, i, 656.
2. MacGregor, W. G. *Med. ill.* 1955, **9**, 773.
3. Rubin, I. C., Morse, A. H. *Amer. J. Roentgenol.* 1939, **41**, 527.
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HEADACHE AFTER SPINAL ANÆSTHESIA

SIR,—I am interested in your annotation (Sept. 22). This distressing symptom, which occasionally occurs after a straightforward lumbar puncture, one has regarded as sometimes likely to be due to a temporary cerebrospinal fistula, the result of a patent puncture of the theca. I have recently had an opportunity of proving this in a patient for whom I had to perform a laminectomy a week or so after the lumbar puncture, the case being one of protrusion of an intervertebral disc. The headache following the first procedure was most intense and very distressing. At operation a small puncture-hole through which cerebrospinal fluid was leaking profusely was found at the level between the 4th and 5th lumbar spines. On completion of the operation this puncture-hole was closed with a fine suture covering a small quantity of extradural fat. The original puncture was performed with a normal fine lumbar-puncture needle.

Princess Elizabeth Orthopædic Hospital, Exeter. NORMAN CAPENER.

OXYTOCIN

SIR,—In your annotation (Sept. 1) on synthetic oxytocin, the impression is given that this preparation has very slight avian depressor activity compared with vasopressin. This is surprising as the avian depressor response is the basis of one of the methods recommended in the *British Pharmacopœia, 1953*, for the biological assay of injection of oxytocin. Comparative figures have been given by van Dyke et al.[1] for the avian depressor activities of purified oxytocin and vasopressin prepared by du Vigneaud. In terms of the *U.S.P.* standard, oxytocin contained 500 units per mg. of depressor activity and vasopressin 85.

Department of Physiology, Charing Cross Hospital Medical School, London, W.C.2. G. W. BISSET
J. LEE.

MIGRAINE TREATED WITH DEOXYCORTONE

SIR,—I read Dr. Durell's letter (Sept. 15) with much interest, as I have myself felt that, at least in certain instances, migraine attacks may be bound up with water-retention. The following brief case-history illustrates this.

A 47-year-old Army officer was invalided from the Service on account of chronic right-heart failure caused by chronic bronchitis and emphysema; he was on a régime of fluid and sodium restriction with periodic injections of mersalyl. As a younger man he had suffered from typical migraine, but had been free from attacks for over ten years until they recurred when he became waterlogged owing to his cardiac failure. The attacks were promptly aborted by injection of mersalyl in the early stages, and prevented altogether if his fluid retention was prevented from becoming severe. He was an observant patient, and was able to recognise early premonitory symptoms and telephone his doctor so that the impending attack might be forestalled.

The combination of cardiac failure and migraine must be fairly common, and it would be interesting to know if other doctors have met similar cases.

Fifield, near Maidenhead, Berks. D. E. MARMION.

1. van Dyke, H. B., Adamsons, K. jun., Engel, S. L. *Recent Progr. Hormone Res.* 1955, **11**, 1.

DIETETICS IN THE MODERN WORLD

SIR,—May I comment on last week's annotation? A neologism is a new, or at least novel, word and the term is generally used pejoratively. But "trophology" is no new word. It is older than biochemistry and as old as bacteriology; last century it appeared in Billings dictionary.

Besides having respectable antecedents, trophology is a valuable word, and Dr. A. P. Meiklejohn is to be congratulated on reintroducing it for two main reasons. First, many trophologically relevant studies of the metabolism of such organisms as yeasts and protozoa would hardly fit into even a broad-minded definition of dietetics or nutrition. A more important reason is the need for increasing the esteem in which those working in the field are held. There are many unenlightened people who regard a dietitian as a glorified, or even a debased, cook. Status, and with it salary prospects, would be improved by a more honourable name.

Rothamsted Experimental Station, Harpenden, Herts. N. W. PIRIE.

THE RELATION BETWEEN SMALLPOX VACCINATION AND POLIOMYELITIS

SIR,—I was much interested in the article by Dr. Chalke and Mr. Clark (Sept. 15).

I am sure it is important, in an investigation such as this, that all cases of poliomyelitis should be examined for a successful vaccination scar in addition to the written record. Several medical officers have given me their vaccination records, but they allow that these have not been checked by actual examination of their cases but are dependent only on verbal inquiry or on their records. In fact, one of the cases included in my investigation was sent into hospital by a medical officer of health as a case of poliomyelitis possibly precipitated by smallpox vaccination. On examination in hospital there was no evidence of a successful "take." All my cases have been examined for a vaccination scar in addition to the written record.

Since my report appeared[1] I have examined in local hospitals a further 16 consecutive cases of children, aged $3\frac{1}{2}$ years or less, with poliomyelitis, including 3 cases of non-paralytic poliomyelitis which showed virus (type 1) in the fæces. Of these 16 cases only 1 had been vaccinated in infancy; this child recovered without paralysis. Including the 19 cases of paralytic poliomyelitis previously reported by me this gives a total of 35 cases, of which only 2 showed evidence of vaccination in infancy.

Weybridge, Surrey. D. P. MACIVER.

TEACHING OF MEDICINE

SIR,—This year the autumnal dirge on medical education has had its sharpest echo in the letter of Dr. Pappworth (Sept. 8). May I take advantage of a coming short absence from this country to sound two notes of hope. Since I have so far been content to practise and not to preach, I should at least escape the gravamen of Dr. Pappworth's opening paragraph.

1. The increasing recognition that general practice is a major specialty, needing postgraduate instruction, and not the sole aim of medical education, has the consequence that not every current "fact" or practical procedure need be taught during the undergraduate period. If this opportunity is imaginatively seized, then the weight of brute facts can be lightened on the student's shoulders, and he may have time to do some thinking.

2. Many medical schools in this country are training 100 students a year, when they could be doing a much better job with 50. Now that some inquiry is being made into how many doctors are really needed, there is a hope that the post-war drive to accept more and more entrants may slacken off. The ultimate solution, given the need for present output of doctors, might even have to be more medical schools; but it seems plain that with present student numbers the opportunity for supervised case-taking, which is the hard core of medical education, is being swamped by lecture-classes, which are at present the unhappy consequence of a low staff-student ratio.

1. *Lancet*, 1956, i, 226.

Department of Medicine, University of Manchester. D. A. K. BLACK.

"BILIRUBIN" AND "CONJUGATED BILIRUBIN"

SIR,—van den Bergh's distinction between "indirect" and "direct" reacting bilirubin has proved to be very useful in clinical medicine. The distinction has had to remain entirely empirical, however, as long as we were ignorant of its real nature. Recently, the difference between the two types of pigment has been clarified, and it seems appropriate to consider whether a more useful terminology may be found.

It has been clear for some time that the pigment which is called "indirect bilirubin" by the clinician and chemical pathologist is known to the chemist as bilirubin. It is a well-defined chemical substance. "Direct"-reacting bile pigment, which is produced in the liver from bilirubin and excreted into the bile, is bilirubin diglucuronide.[1–3] Another similar direct-reacting pigment (originally called[4] pigment 1), which occurs in the serum in hepatitis and in biliary obstruction, is probably bilirubin monoglucuronide. Both these direct-reacting pigments arise by a coupling of lipid-soluble bilirubin with the highly water-soluble sugar derivative, glucuronic acid, through an ester linkage. Similar types of combination occur among other physiological products—e.g., steroids—and the term "conjugated" is often used in describing them.

Recently I approached the heads of some 25 departments of chemical pathology or biochemistry in teaching centres in Britain to obtain their opinions as to the most appropriate terminology. They were asked to consider three possibilities: (1) hæmobilirubin and cholebilirubin; (2) free bilirubin and esterified bilirubin; and (3) free bilirubin and conjugated bilirubin. Approximately three-quarters preferred the term "conjugated bilirubin" for referring to direct-reacting bile pigments. About one-third of these objected to speaking of "free" bilirubin, since it exists in plasma as a loose complex with certain proteins. Thus, it seems that the terms "bilirubin" and "conjugated bilirubin" would be more acceptable than any of the present alternatives. Naturally, there are circumstances in which it will be more appropriate to refer to the pigments individually by their proper chemical names—bilirubin, and bilirubin mono- and di- glucuronides.

There are good reasons for general adoption of the terms "bilirubin" and "conjugated bilirubin" in clinical chemistry, and some uniformity is desirable, particularly for teaching purposes. The term "conjugated" is already used in a number of parallel cases with which the student should be familiar. In the case of the bile pigments, recognition of the type of change is the key to an understanding of many observations of importance in clinical medicine. Thus, the fact that the liver is the main site of biochemical transformations, and especially of conjugations, explains the association of bilirubin with hæmolytic disease and with functional prematurity, whilst the conjugated forms predominate in hepatitis and biliary obstruction. It is known that many conjugations result in greater water solubility (e.g., pregnanediol and its glucuronide) and this is also true of

1. Billing, B. H., Lathe, G. H. *Biochem. J.* 1956, **63**, 6P.
2. Talafant, E. *Chem. Listy*, 1956, **50**, 817.
3. Schmid, R. *Science*, 1956, **124**, 76.
4. Cole, P. G., Lathe, G. H., Billing, B. H. *Biochem. J.* 1954, **57**, 514.

bilirubin. The difference in biological behaviours of these pigments appear to be largely determined by the difference in their solubilities. For instance, this explains why there is acholuria in hæmolytic disease, but not in obstruction. The well-known affinity of lipids for brain tissue, as exemplified by the classical anæsthetics, is also shown by bilirubin (producing "kernicterus" when in great excess) while the water-soluble glucuronides have no adverse effect on the brain. In this respect the difference between unconjugated and conjugated bilirubin is paralleled by morphine and its excretion product, morphine glucuronide, since the latter is without pharmacological effect. Differences in solubility also determine the type of van den Bergh reaction. Alcohol is necessary for bilirubin to react, because in its absence bilirubin is not in true solution [5] (under the acid conditions of the test). The bilirubin glucuronides, being soluble, react directly.

As all of these aspects of the behaviour of bile pigments are of importance to the clinician and medical student, it seems appropriate to use a terminology which stresses the basis on which they all depend.

The Bernhard Baron Memorial Research Laboratories, Queen Charlotte's Maternity Hospital, London, W.6. G. H. LATHE.

AN ANTICONVULSANT FOR PSYCHOMOTOR EPILEPSY

SIR,—In your annotation last week you said: "Psychomotor epilepsy remains resistant to medical treatment: any new drug which may be used to combat it is therefore welcome." You then quoted the results by Zimmerman with 'Celontoin,' a new substance. This prompts me to point out that 'Mesontoin' (methoin *B.P.*) has been used with even greater success in this indication by Harris and Otto.[6] The following is a comparison of results:

Authors	*No. of cases*	*Relief*		
		Complete	*50%*	*None*
Zimmerman	35	7	27	1
Harris and Otto ..	20	13	6	1

Sandoz Products Ltd., 134, Wigmore Street, London, W.1. B. MORGENSTERN.

"MUNCHAUSEN'S SYNDROME"

SIR,—With the help of colleagues in other hospitals, from the patient's own statement, and from other sources, we have managed to piece together the background of the man described by Mr. Mawson [7] and others earlier this year.

We saw him first when he was admitted to Liverpool Royal Infirmary on Feb. 12, complaining of headache and giddiness. Tall and fair-haired with a crew-cut, he had scars of mastoid and craniotomy operations, a complete right facial palsy, and right middle-ear deafness with a large perforation of the right drum. There was some blurring of the right optic disc. A soft diffuse goitre was present. Because a cerebral abscess was suspected, he was admitted under the care of Dr. Wyn Jones. Next day it was realised that he was the man described by Mr. Mawson, and it was decided to observe him both from clinical and psychiatric aspects.

Intermittent pyrexia persisted throughout his eleven days in hospital, reaching 102°F at times; but there were no corresponding changes in pulse-rate. He was closely watched while he had his temperature taken, both orally and in the axilla; he would not permit rectal temperatures to be taken.

Lumbar puncture was performed under anæsthesia: pressure 140 mm., Queckenstedt test normal; 19 leucocytes per c.mm., protein 70 mg. per 100 ml. The blood-count and erythrocyte-sedimentation rate were normal. X-ray examination of the skull: loss of trabeculæ detail in right mastoid region; large bony defect in occipital region with several trephine openings in addition; many metal clips were visible.

Behaviour in Hospital

He was aggressive, impulsive, resentful, particularly of personal questions, and refused to see a psychiatrist. Although anxious for medical investigation and treatment he would permit a lumbar puncture only under full anæsthesia.

On Feb. 16 one of us saw him without declaring his position as psychiatric registrar. He was suspicious but communicative, and continued to confabulate. Next day he was asked to read the several letters describing his case in *The Lancet*. For half an hour he denied that they could refer to him, but eventually he agreed that they did. He then volunteered further information about his medical history, most of which, but not all, has proved correct. He was still unwilling to discuss his private history and what details he gave were mostly untrue.

When asked why he had lied he said that when a hospital discovered his previous history he was treated unsympathetically. After our earlier discussions he became extremely friendly and even over-familiar, and at times was anxious to discuss his future with us. He was delighted at the possibility of taking up nursing in a sanatorium.

On Feb. 21, his birthday, a party was given in the ward. Birthday-cards, presents, and a cake moved him to tears and then followed a period of high spirits for several hours. Next day, having found out that one of us was a psychiatric registrar he left the ward and sought justice at the psychiatric clinic. He was very antagonistic at first but quickly responded to conciliatory gestures.

It was decided on Feb. 23 to take simultaneously oral and rectal temperatures. He was annoyed by the implication of malingering and obviously felt that we had betrayed his confidence—the result being that we were unable to carry out the procedure. He demanded to leave hospital provided that it was not against medical advice. This was allowed and he departed only to return at 11.0 P.M. the same evening by ambulance after a "dizzy spell" in a cinema. He refused to go until seen by one of us but on the suggestion that he should remain for psychiatric observation he "reeled" out of the hospital falling as he went. Next day he visited the ward dressed in new clothes but disappeared on hearing that he was wanted by the police.

Synopsis of Personal History

Born Feb. 21, 1934. (Running ear all his life.) Mother married at 17. Father heavy gambler, disappeared 1946. With mother, he went to live with grandmother in Dublin. 1945 (aged 11), mother died of tuberculosis. Grandmother became guardian. He became rebellious and spent three years with Dr. Barnado's. Returned to grandmother in 1949. Irresponsible, without interests or hobbies. Change for better while working in saw-mill in Dublin, well liked. Left this job and came to England.

Nov., 1953: Placed on two years' probation for insulting words and behaviour, wilful damage, and larceny, on condition that he accepted treatment at Warlingham Park Hospital.
Jan., 1954: Absconded, warrant issued.
July, 1954: Charing Cross Hospital. Removed in strait-jacket after being seen by D.A.O.
Sept., 1954: Six months for larceny.
Feb.–May, 1955: Spent periods in Llandough Hospital, Cardiff (right radical mastoidectomy, took own discharge) and St. Charles' Hospital, London (middle-fossa dura explored, radical mastoidectomy, facial palsy resulted).
June, 1955: Six months for stealing.
Oct., 1955: London Hospital, discharged himself.
Nov., 1955: West End Hospital, London, exploration of posterior fossa, temporal burr.
Nov., 1955: Royal Northern Hospital, London.
Dec., 1955: King's College Hospital, radical mastoidectomy, discharged himself.
Jan., 1956: Seen by grandmother in Dublin, "gentlemanly behaviour."
Feb., 1956: St. Giles Hospital, London; Cane Hill Mental Hospital, Surrey; Royal Infirmary, Liverpool.
May, 1956: Charged with housebreaking, asked for a Liverpool theft to be taken into account. Sentenced to 15 months' imprisonment.

As a result of our observations we regard his condition as a psychopathic state of aggressive type in a man of good average intelligence. He showed marked emotional instability, at times being aggressive and hostile, and at others affectionate and dependent. He continued to confabulate even when he knew that he was not being believed.

Our personal experience with him showed that he had the ability to respond to sympathetic handling and might still benefit from further attempts at social rehabilitation.

We are indebted to Dr. Wyn Jones and Dr. Barton Hall for their advice and criticism, and also to Dr. Margaret Macaulay and the staff of the Royal Infirmary for their part in the management of this patient. We also wish to express our gratitude for the information we have received from the

5. Jirsa, M., Večerek, B., Ledvina, M. *Nature, Lond.* 1956, **177**, 895.
6. Harris, T. H., Otto, J. L. *Tex. St. J. Med.* 1947, **43**, 328.
7. Mawson, S. R. *Lancet*, 1956, i, 107.

various hospitals mentioned and to those authorities and relatives who provided personal details about this young man.

D. G. JULIAN
R. MIDDLEFELL.

Liverpool Royal Infirmary.

CHLORPROMAZINE IN OBSTETRICS

SIR,—I was extremely interested to read, in your annotation of Sept. 15, about the use of chlorpromazine in the treatment of nausea and vomiting in early pregnancy and in labour. Chlorpromazine may also be used to prevent vomiting, which frequently follows the administration of an anæsthetic for instrumental delivery, cæsarean section, or the manual removal of the placenta. In 125 consecutive cases I have used a mixture containing 12·5 mg. of chlorpromazine and 50 mg. of pethidine in 10 ml. of physiological saline, which is given intravenously immediately after delivery, to produce a quiet and vomit-free postanæsthetic period. In this series of 125 cases there has been no case of vomiting postoperatively, and all patients have regained consciousness within five minutes of cessation of anæsthesia and thereafter have slept quietly for several hours.

A full report of this series is being prepared.

Kingsbury Maternity Hospital,
London, N.W.9. D. C. HUGHES.

CALORIE INTAKE IN RELATION TO BODY-WEIGHT CHANGES

SIR,—Professor Kekwick and Dr. Pawan reported (July 28) that weight-loss in short-term experiments with human beings was greater on a high-fat diet than on a low-fat diet. It is perhaps of interest in this connection to recall that just the opposite has been observed in long-term animal experiments.

In growing rats given the same amount of calories in diets containing 2% and 30% of fat, the weight gain was greater on the high-fat than on the low-fat diet (0·067 g./Cal./day as against 0·060 g./Cal./day).[1]

In rats with hypothalamic obesity the average weight gain on a high-fat diet containing 60% of fat was 0·066 g./Cal./day. On a high-carbohydrate, low-fat diet containing only 5% of fat, it was 0·048 g./Cal./day.[2]

Second University Clinic of Internal
Medicine, Kommunehospitalet,
Aarhus, Denmark. KNUD LUNDBÆK.

BURNS AND SCALDS

SIR,—Profesor Wells (Sept. 15) has rightly praised the efficacy of treating acute burns by exposure in the hot dry climate of Iraq, but it should not be forgotten that this method was revived and developed by Wallace with success in a Scottish climate which is traditionally neither hot nor dry. The exposure treatment has been practised in this country in a number of centres over the past few years, and although it has certain limitations has proved highly successful. If Professor Wells is concerned about the rigours of the British climate, he may find that the judicious placing of an infrared element to provide irradiation by the long-distance flood method produces a local climate nearer that of the Mediterranean.

There is no doubt that the quality of the granulations is likely to be impressive, but Professor Wells adds: "I saw no hint of contracture." Such a happy result can only have been due to prompt grafting of the granulating areas in Professor Wardill's clinic. It would be unfortunate if any readers of Professor Wells's eulogy assumed that certain granulations were, by some special magic of exposure, immune to contraction which is the natural mechanism by which such areas heal.

It is curious how any discussion of the treatment of burns invariably seems to become bogged down by loose statements, and by extravagant claims, often based on conclusions falsely drawn about the results of treatment carried out on burns of widely differing depth and type in patients of different age-groups. Even such a bacteriological authority as Dr. Colebrook (June 2), in considering the case of an elderly lady with a scalded foot who had suffered weeks of pain before finally healing with unstable scar tissue, was led to make the astonishing statement: "one may confidently hazard the guess that had the scalded foot of your correspondent's wife been covered generously with penicillin cream she would have had no pain at all from that time; her burn would almost certainly have escaped streptococcal infection." Could faith in the properties of penicillin be greater? Streptococcal infection may (relatively rarely) complicate burn therapy, and penicillin is an invaluable substance; but to elevate antibiotic therapy from a subordinate rôle only clouds the real issue—is skin replacement required? As regards pain, infected burns are usually painful, but the conception that an uninfected burn is necessarily painless is a myth; destruction of surface epithelium is painful whether caused by burning, removal of the surface layers for grafting, or abrasion, particularly when movement takes place.

Surely the basic pathological fact about a burn is that it is a traumatic lesion with damage to, or loss of, the skin. It is not some kind of dermatological disease that will respond to the application of the great variety of substances, ranging from honey to anti-histamines and penicillin, which have all had their advocates. In the case of superficial burns, the residual epithelium will heal, if allowed, in 10–21 days, depending on the depth of destruction. Our aim must be to avoid placing any substance on the surface which might hinder regeneration. Our own preference, from the point of view of the patient's comfort, temperature regulation, and ease of management, is exposure whenever possible (burned hands excepted). Colebrook favours a generous covering of penicillin cream. We dislike covering burns with a messy layer of 'Lanette wax' and paraffin to which some penicillin has been added, and prefer to rely on dryness of the surface and systemic administration of antibiotics in controlled dosage to avoid infection. But such differences are of minor import; in superficial burns, whether treated by exposure or occlusion, infection is uncommon and healing is spontaneous. Such burns do not present a surgical problem.

The situation is otherwise with deep burns. By whatever method they are treated, infection occurs beneath the separating sloughs and pus may loculate until separation is complete, disclosing a granulating bed. The granulations are inevitably infected. There is only one dressing that will effectively seal the wound, and that is skin. Preoccupation with the effects of antibiotics and antiseptics on the surface of the gangrenous area is futile, and attempts to produce bacteriological sterility of the granulations only lead to procrastination and the production of a "chronic burn." The treatment of the deep burn is neither bacteriological nor medicinal: it is surgical as in other forms of gangrene, and involves removal of the slough as soon as possible. In this way some of the dangers of the suppurative slough-separation stage can be circumvented. The production of granulations, even as "translucent as a newly-varnished oil painting" is not an object of treatment; the raw areas created by excision are either grafted immediately or the skin is preserved and applied a few days later. Small burns, where the depth is undoubted, can be successfully excised and grafted on the day of infliction, with a great saving in time and suffering. Larger areas present greater technical difficulties; but there is nothing to be gained by watching sloughs give place to granulations over a period of weeks or months, however admirable the appearance of the granulations or however excellent the bacteriological reports may be.

Queen Victoria Hospital,
East Grinstead, Sussex. JOHN WATSON
C. R. MCLAUGHLIN.

1. Forbes, E. B., Swift, R. W., Elliot, R. F., James, W. H. *J. Nutr.* 1946, **31**, 203.
2. Lundbæk, K., Stevenson, J. A. F. *Amer. J. Physiol.* 1947, **151**, 530.

Obituary

JOHN BERESFORD LEATHES

M.A., B.M. Oxfd, Hon. D.Sc. Sheff. & Manc., F.R.C.P., F.R.C.S., F.R.S.

Dr. Leathes, emeritus professor of physiology in the University of Sheffield, died at Montreux on Sept. 14, within a few weeks of his 92nd birthday. The second son of the Rev. Stanley Leathes, D.D., he was educated at Winchester and New College. He was at first destined for the Church, but the fascination of scientific discovery led him to lay aside classical studies to enter on his chosen career in medical science, to which in later years he contributed so much. His interest in the classics was maintained, however, throughout his life; his knowledge of Greek enabled him in his retirement to indulge in a field of literature which he always found satisfying.

[Lafayette

In 1893 he qualified from Guy's Hospital and the following year took the F.R.C.S. It is doubtful if he had any intention of practising as a surgeon, for he was greatly handicapped by defective vision. In 1895 he began the study of the subject in which he subsequently excelled—chemical physiology. Biochemistry had not yet become a separate discipline, and Leathes would certainly have been unwilling to separate it from physiology at that time, though the separation was later foreshadowed in his *Problems in Animal Metabolism*. He worked in Berne under Drechsel until 1897 and then spent two years with Schmiedeberg in Strasbourg. Returning to England he was appointed lecturer in physiology at St. Thomas's Hospital and held this post till 1909. During these years he spent each afternoon carrying out and directing research at the Lister Institute in company with C. J. Martin, Harden and Young, Boycott and Ledingham, and Cathcart and Dakin. It was here his lifelong friendship began with the late H. S. Raper, on the shaping of whose early career Leathes had so much influence. In the summer of 1904 he gave eight lectures in the physiological laboratory at South Kensington which were the basis of *Problems in Animal Metabolism* (1906). This thought-provoking book illustrates the care and discriminating judgment which Leathes always brought to bear on the problems he sought to elucidate.

In 1909 he was appointed professor of pathological chemistry in Toronto, where his friend Raper joined him as lecturer in the following year. In 1910 they published their joint biochemical monograph *The Fats*, a second and enlarged edition of which appeared in 1925.

Leathes returned to England at the outbreak of war in 1914 and the following year, on the invitation of H. A. L. Fisher, vice-chancellor of Sheffield University, whom he had known at New College, he went to Sheffield as professor of physiology. He had already, in 1911, been elected F.R.S., and the young university was fortunate in attracting a man of his stature. There he entered with zest into developing the medical school and found an able collaborator in the late Sir Arthur Hall. Leathes had long felt the need to break down the barrier between preclinical and clinical studies and to introduce into clinical medicine the methods of thought and practice used in the laboratory. His inability to develop these views in London had been a factor in his decision to go to Toronto. In Sheffield his task was less difficult and his energy, enthusiasm, tact, and patience gradually overcame opposition. In 1919–20 he established biochemical laboratories in the two general hospitals with one of his lecturers in charge; the student curriculum was revised so that physiological studies were continued into the final year and applied physiology was taught at the bedside; he was appointed to the staffs of the hospitals as honorary physiologist. He welcomed the appointment of Edward Mellanby as professor of pharmacology in 1920 and with him produced some of the first insulin to be made in this country for clinical use.

Leathes played a leading part in the revival of dental education in Sheffield. His prestige among his clinical colleagues enabled him to gain their help in providing better facilities for clinical dentistry and in 1922 the university was able to institute its own qualifications in dentistry. He was dean of the faculty of medicine from 1916 to 1922 and again from 1931 to 1933. His first tenure of this office was ended by illness from which happily he made a complete recovery, and it was during his convalescence that he first took up art as a hobby. He developed considerable skill in the use of pastel and amassed a collection of pictures as souvenirs of holidays at home and abroad which were shown only with diffidence to his friends.

He had been elected to the Physiological Society in 1895, and he served for a short time as secretary before leaving for Toronto and, for ten years, as an editor of the *Journal of Physiology*. He was on the council of the Royal Society from 1924 to 1926 and a member of the Medical Research Council from 1928 to 1931. In 1921 he was elected a fellow of the Royal College of Physicians under the by-law which allows the election of distinguished medical men who are not members of the college, and in 1923 he gave the Croonian lectures on the rôle of fats as vital phenomena. His Harveian Oration in 1930, entitled the Birth of Chemical Biology, was based on a survey of the work of John Mayow and his contemporaries. Leathes received the honorary degree of D.Sc. from Sheffield on retirement from his chair in 1933 and the honorary D.Sc. from Manchester in 1936. Of all honours, however, that which gave him greatest pleasure was his election as an honorary fellow of New College, Oxford.

Leathes served as the representative of Sheffield University on the General Medical Council from 1919 till 1938. Elected to the education committee in 1925, he was appointed chairman in 1931, and during his term of office had had the arduous task of producing one of the periodic revisions of the council's *Recommendations on Medical Education*. On his retirement the president paid tribute to his wide knowledge and discriminating judgment which were "placed without stint at the disposal of the Office, the Committee, and the Council."

Without stint! These words could be applied to every service which Leathes undertook, to every effort he made. His unbounded mental and physical energies were always at the disposal of students, colleagues, or friends who sought his aid. Handicapped though he was by his visual defect, he gladly spent long hours improving the literary efforts of some callow author who showed scientific promise. His handwriting was difficult to read, but the thoughts and feelings which it conveyed were well worth the effort of deciphering. At least one of his correspondents still cherishes a bundle of letters extending over many years.

His students looked on him with a warm affection, coupled with respect amounting to veneration. The esteem in which he was held by his colleagues was shown by his election as president of the Sheffield Medico-Chirurgical Society in 1933, a unique honour for one not in clinical practice. His intimate friends will never forget the pleasant and intellectually profitable hours spent in his company, whether tramping the Derbyshire moors which he loved, lunching in a village tavern on sandwiches and ale, or sitting in the peaceful seclusion of the fireside after dinner. His views on modern trends are in part revealed by this extract from a lecture he gave in Sheffield on the Vis mediatrix Naturæ:

> "New knowledge in itself is a factor in the environment of human life to which adjustments have to be made and in all probability the best part of the adjustment will not be the result of conscious planning. Life has looked after itself for hundreds of millions of years without a trace of what can be recognised as consciousness, done it extraordinarily well and continues to do so still, much more than we in our vanity imagine."

After retirement Leathes lived in Wantage for a time and then moved into Oxford where, to his great joy, his friend John Mellanby provided him with facilities for work in the physiological laboratory. The second world war, however, interfered and Leathes moved to Lyme

Regis, where he was fortunate to find friends from his Winchester days. He finally settled in Switzerland, a country with which he had many close associations; it was there he spent four years at the beginning of his career, it was there he met his wife, and it was there he spent many happy holidays throughout his active life.

G. A. C.

Diary of the Week

SEPT. 30 TO OCT 6.

Tuesday, 2nd

ROYAL ARMY MEDICAL COLLEGE, Millbank, London, S.W.1
5 P.M. Dr. L. Guttman: Treatment of Traumatic Paraplegia.
INSTITUTE OF DERMATOLOGY, St. John's Hospital for Diseases of the Skin, Lisle Street, W.C.2
5.30 P.M. Dr. P. F. Borrie: Circulation and Vascular Reactions.

Wednesday, 3rd

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.15 P.M. *History of Medicine.* Dr. John Keevil: Naval Medicine in the 16th and 17th Centuries.
8 P.M. *Surgery.* Prof. C. G. Rob, Dr. W. G. Oakley, Dr. G. E. Mavor: Management of the Gangrenous Foot.
POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Prof. Montague Maizels: Place of Chemical Pathology in Medicine.
INSTITUTE OF DISEASES OF THE CHEST, Brompton, London, S.W.3
5 P.M. Mr. N. R. Barrett: Achalasia.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. P. J. Hare: Sweat Secretion and Abnormalities.
MIDLAND MEDICAL SOCIETY
8.15 P.M. (Birmingham Medical Institute, 154, Great Charles Street, Birmingham, 3.) Dr. Walter Bauer (Harvard): Management of Gout.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) *Medicine.* Dr. R. M. Forrester: Cerebral Palsy.

Thursday, 4th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Mr. D. W. C. Northfield: Rathke Pouch Tumours. (Presidential address.)

Friday, 5th

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Anæsthetics.* Dr. Sheila M. Wilson: Electroencephalography in Relation to Anæsthesia. Dr. D. J. Pearce: Rôle of Posture in Laminectomy.
POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. F. R. Edwards: Atrial Septal Defects.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. S. E. Birdsall: Tonsillectomy in Children and Adults.

Appointments

BATCHELOR, I. R. C., M.B. Edin., F.R.C.P.E.: physician-superintendent of Dundee Royal Mental Hospital and physician in charge of psychiatric unit, Maryfield Hospital, Dundee.
FRANK, H. F., M.D. Lpool, F.F.R., D.M.R.T.: consultant radiotherapist, Radiotherapy Centre, Leeds.

Manchester Regional Hospital Board:

BARLOW, T. G., M.B. Manc., F.R.C.S.: consultant orthopædic and traumatic surgeon (part-time), Ashton, Hyde, and Glossop group of hospitals.
CHERKAWSKY, J., MED.DIP. Poznan: whole-time assistant physician in geriatrics, Burnley and district group of hospitals.
DAVIDSON, I. W., M.B. St. And., D.A.: whole-time assistant anæsthetist, Salford group of hospitals.
EVANS, A. R., M.B. Wales: assistant pathologist, Wigan and Leigh group of hospitals.
SIMMS, O. H., M.B. Sheff., F.F.A. R.C.S.: consultant anæsthetist (part-time), Lancaster and Kendal group of hospitals.

Colonial Appointments:

ADEWOLE, F. O., M.B. Glasg., D.T.M. & H.: specialist surgeon, Federation of Nigeria.
BISLEY, G. G., M.R.C.S., D.T.M. & H., D.O.: specialist (ophthalmic) medical department, Kenya.
MABAYOJE, J. O., M.R.C.P.E.: specialist physician, Federation of Nigeria.
MARRABLE, I. H., M.R.C.S.: senior M.O., Tanganyika.
NICHOLSON, BASIL, M.B. Manc., D.P.H., D.T.M. & H.: senior leprosy officer, western region, Nigeria.
READ, M. T., M.B.E., M.C., M.R.C.S., D.T.M. & H.: D.D.M.S., Sarawak (secondment to Brunei).

Births, Marriages, and Deaths

BIRTHS

ROE.—On Sept. 1, at University College Hospital, London, W.C.1, to Kathleen (née Dempsey), wife of Dr. Peter W. Roe, of 43, Belmont Road, Bushey, Herts—a daughter (Jane Martha).

Notes and News

TWENTIETH-CENTURY PATRONS

IN the introduction to its annual report for 1955–56[1] the Nuffield Foundation compares itself to a private bank which finances projects that yield dividends in terms not of cash but of public good, and disarmingly admits its preference for high dividends rather than secure investments. The foundation holds a courageous and enterprising view of the art of patronage in modern times. Its job, it believes, is to back the potential rather than the successful, to seek out the original and unorthodox rather than accept the fashionable and immediately popular, and to initiate rather than to maintain. In the words of the report "a foundation must ever be turning away from old friends and familiar ways and nerving itself to walk alone, sustained by the hope that some new and private path may lead to a rewarding prospect." The prospect for next year seems interesting and varied.

Under the heading of biological research it is announced that Dr. A. G. M. Weddell is to receive a grant for a plan to study the mechanism of common sensation by observing the effect of the leprosy bacillus on the cornea, and Prof. H. McIlwain for his investigation into the control of metabolism in normal mammalian cerebral tissue. In the medical section Prof. A. Neuberger, F.R.S., has been offered a grant of £10,000 over three years for his research into the mechanism of collagen formation and the chemistry and metabolism of those proteins which are neither collagen nor plasma-protein. The foundation is also supporting research at the Radcliffe Infirmary into the after-effects of tuberculous meningitis. A grant of £20,000 for five years is to go to the University of London to set up a biomechanical unit where Dr. J. T. Scales and Mr. J. M. Zarek will continue their work on the application of mechanics to the study of forces and actions in the living body. Grants towards social research include support for a survey of the younger chronic sick in the North East Metropolitan Hospital Region by Miss Ann Whitaker, who is a hospital almoner. Fortunately only a small proportion of the chronic sick are young people, but, as has already been pointed out in our columns,[2] arrangements for their care are haphazard and inadequate.

This brief selection from the Foundation's investment list suggests that its return in visible and invisible dividends will be rewarding.

A NEW R.S.M. SECTION

THE library (scientific research) section was inaugurated at a reception held on Sept. 25 at the house of the Royal Society of Medicine, 1, Wimpole Street, London, W.1. Prof. Charles Rob, president of the section, said that it had been formed for three reasons: because many firms and institutions had asked if they could use the library for medical and scientific research; because the society needed to increase its income; and because it was the society's policy to make any proper contribution it could to a closer ethical relationship between the medical profession and industry.

In the past much informal help has been given by the library to visitors who were not members or fellows of the society, but such skilled help is expensive and the society feels that it can no longer provide it. Indeed many of the visitors, as Professor Rob admitted on Tuesday, have felt uncomfortable at accepting these hospitable services and have been anxious to be able to use the library more freely and to be able to pay the society for doing so.

By its charter the society cannot admit corporate members, but a member of the new section will be entitled to use the library on behalf of any organisation by which he is employed. There will be grade-1 or grade-2 "borrowing members," who may borrow 8 or 4 items from the library. They will also hold transferable reader's tickets which may be used by any colleagues in the same organisation. "Reading members" will not be entitled to borrow from the library, and their reader's tickets will not be transferable.

Fellows joining the new section must pay an appropriate subscription. Membership will not be open to people employed by medical organisations, such as hospitals or medical libraries, for their employers would usually be eligible to join the society as fellows. To borderline cases, such as medical publishers and abstracting agencies, Professor Rob promised special consideration. He also said that the minimum annual subscription of 50 guineas could be varied where special circumstances obtain.

1. Nuffield Foundation: Report 1955–56. Published by the Foundation, Nuffield Lodge, Regent's Park, London, N.W.1. Pp. 160.
2. Sharp, M. U. *Lancet*, 1955, i, 1263.

Q.T. GREAT BRITAIN

AN association has lately been formed, with this title, for promoting the welfare of patients who have been treated by colectomy resulting in a permanent ileostomy. This is the outcome of recent meetings in Birmingham [1] and London. The plan is to set up regional divisions, the first two being based on London and Birmingham. A national committee may later be formed to coördinate work common to all divisions. The name Q.T. comes from a similar organisation formed in Boston, Mass., in 1952 and so named because Q.T. were the initials of the wards of the hospital in which the founders of the group had been treated. Similar groups have since been formed in many parts of the United States. The new organisation aims to circulate information on appliances and techniques and matters relating to employment, marriage, pregnancy, life insurance, &c., to encourage work on rehabilitation, and to organise personal visits to help patients about to undergo an ileostomy. A newsletter, edited by Dr. Cuthbert Dukes, will be issued periodically to members. Further information may be had from the secretaries, Mrs. D. Harris, 21, Wilderness Lane, Great Barr, Birmingham, 22a, and E. Lloyd-Lucas, 4, Dering Street, London, W.1.

A FILM ABOUT CORTISONE

A FILM now being shown in London, called *Bigger Than Life*, is said to be based on an actual case-history. It tells the story of a schoolmaster, played by James Mason, who has an illness diagnosed as polyarteritis nodosa. His experiences in hospital are portrayed with a realism that will convince everyone, except perhaps doctors. He is much improved by cortisone and he is advised to take it six-hourly for the rest of his life. He is also warned not to exceed the stated dose and to report immediately any change in his mental condition. Both warnings go unheeded: lured by the euphoriant action of the drug he soon takes cortisone tablets in the manner of "pep" pills. As a result he becomes mentally ill, passing in dramatic crescendo, through grandiose, persecutory, and religious phases, and making a murderous assault on his wife and child. The story is vividly told, and one is glad that an X certificate forbids children from seeing it. All ends happily after a further stay in hospital and a spell of "deep-sleep" treatment.

Whatever one may think of the other medical issues involved there can be no quarrel with the main message of the film—namely, that a powerful drug is potentially harmful, especially when taken in defiance of medical advice. A statement issued by the British Medical Association says that doctors who saw a preview blamed the film for giving a "dangerous presentation" of the action of cortisone. But the patient clearly disregarded the warnings he had been given and it is hard to see where the danger lies.

University of Durham

On Sept. 22 the D.P.M. was conferred on A. C. Gibson and H. S. McWalter.

Royal College of Surgeons of England

Dr. William Brockbank will deliver the Thomas Vicary lecture on Thursday, Oct. 25, at 5 P.M., at the college, Lincoln's Inn Fields, London, W.C.2. The title of his lecture is The Man who was Vidius.

Institute of Dermatology, London

The first semi-permanent exhibition of the winter course is by Dr. H. Haber, on dyskeratosis. It will be open from Oct. 1 to 27 at the institute, Lisle Street, W.C.2.

Royal Medico-Psychological Association

On Friday, Nov. 16, at 2.15 P.M., at 1, Wimpole Street, London, W.1, Dr. J. R. Rees will deliver the Maudsley lecture. He is to speak on psychiatry and public health.

Chadwick Lectures

At 5.30 P.M. on Thursday, Nov. 22, at the Royal Society of Health, 90, Buckingham Palace Road, London, S.W.1, Dr. P. A. Raffle, senior medical officer, London Transport Executive, will give a lecture on the health of the worker. Dr. J. N. Morris, director of the social medicine research unit of the Medical Research Council, will give the Malcolm Morris lecture at 5 P.M. on Thursday, Dec. 6, at the Wright-Fleming Institute, St. Mary's Hospital, W.2. He is to speak on clinical and community medicine.

1. See *Lancet*, 1956, i, 518.

Association of Surgeons of Great Britain and Ireland

In 1957 the annual meeting of this association will be held in Newcastle upon Tyne on April 25, 26, and 27.

Royal Appointment

Major-General P. F. Palmer, late R.A.M.C., has been appointed honorary surgeon to the Queen in succession to Major-General Richard Murphy.

Westminster Medical School

The date of the opening of the new session of this school has been changed. Viscount Chandos will now deliver the inaugural address at Church House, Great Smith Street, S.W.1, at 3 P.M. on Monday, Oct. 22.

Leeds Medical School

The annual dinner for past and present men students will be held at the Griffin Hotel, Leeds, on Friday, Nov. 2, at 7.30 P.M. Applications for tickets (25*s*.) should be sent to the dinner secretary at the school.

West End Hospital for Neurology and Neurosurgery

A course of clinical demonstrations in neurology is to be held at the hospital on Tuesdays at 5.30 P.M. from Oct. 2 to Dec. 18. Further particulars may be had from the secretary of the medical school, 91, Dean Street, London, W.1.

London Hospital

The old students' dinner will be held at the Trocadero Restaurant, Piccadilly Circus, W.1, at 7.45 P.M. on Thursday, Oct. 11. Sir Henry Tidy will be in the chair. Tickets (32*s*. 6*d*., or 25*s*. for those qualified under five years) may be had from Dr. R. R. Bomford, 22, Harley Street, W.1.

Wessex Rahere Club

The autumn dinner of this club will be held at the Grand Spa Hotel, Bristol, on Saturday, Oct. 27. Membership of the club is open to all Barts men practising in the West Country. Further particulars may be had from Mr. A. Daunt Bateman, 11, The Circus, Bath.

N.A.P.T. Canadian Scholarship

The National Association for the Prevention of Tuberculosis is offering a Canadian scholarship in 1957 to enable a British chest physician to visit Canada for three months.

The scholar's tour, which will start in May, will be arranged with the Canadian Tuberculosis Association. The amount of the award is £350, and the scholar will live free of cost in Canadian sanatoria. Further particulars can be had from the secretary-general, N.A.P.T., Tavistock House North, London, W.C.1, to whom applications must be sent by Dec. 31.

British Institute of Radiology

The annual congress and exhibition of this institute will be held on Dec. 6 and 7 at Caxton Hall, Westminster. Sir Stanford Cade will give the opening address, on radiation-induced cancer in man; and Prof. John Caffey, of Presbyterian Hospital, New York, the Mackenzie Davidson lecture, on traumatic lesions of the growing skeleton, other than fractures and dislocations. Further particulars may be had from the general secretary of the institute, 32, Welbeck Street, London, W.1.

Chartered Society of Physiotherapy

The annual congress of this society will be held at St. Pancras Town Hall, Euston Road, London, N.W.1, on Oct. 4, 5, and 6. The opening lecture will be given by Mr. A. McDougall on athletic injuries. Other medical speakers will include Dr. J. S. Lawrence, Squadron-Leader C. B. Wynn-Parry, Mr. E. W. Somerville, Dr. J. R. Napier, and Prof. Norman Capon. The founders' lecture will be given by Sir Russell Brain, P.R.C.P., who is to speak on pain. Further particulars may be had from the secretary of the society, Tavistock House (South), W.C.1.

Mr. Alexander Miller and Mr. E. A. Nicoll are visiting South Africa as the guests of the gold-mining industry to lecture on traumatic and orthopædic surgery in hospitals owned by the industry in the Transvaal and Orange Free State. They have also been invited to lecture in the university centres of Johannesburg, Pretoria, Durban, and Cape Town.

CORRIGENDA: *Deaf or Backward?* In Dr. William Dunham's letter last week (p. 631) the footnote should have referred to *Lancet*, 1953, i, 416.

Effect of Insulin after Adrenalectomy.—In the article by Dr. Ginsburg and Dr. Paton (Sept. 8), the words "blood-glucose level" appear in the discussion on p. 493 (4th paragraph, 6th line). The words should have been "blood-*cortisone* level."

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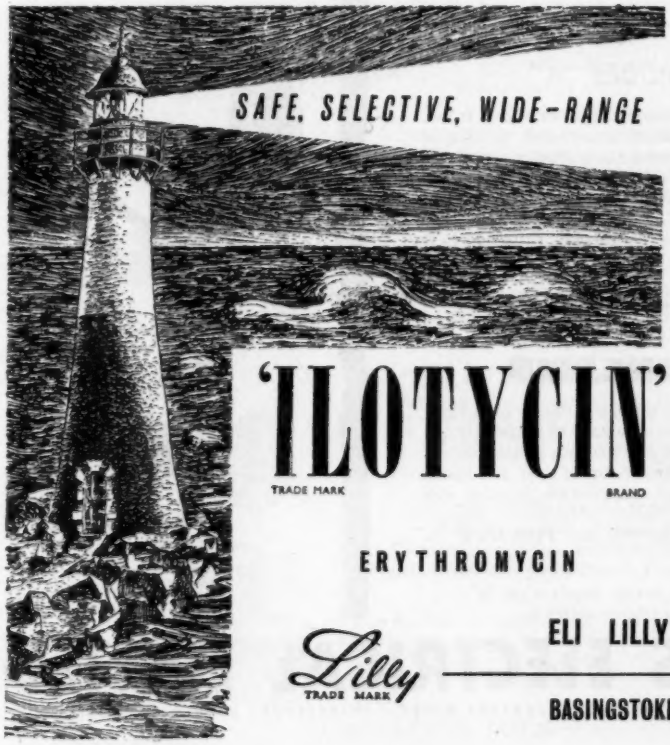

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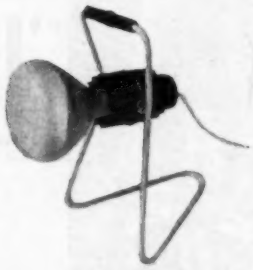

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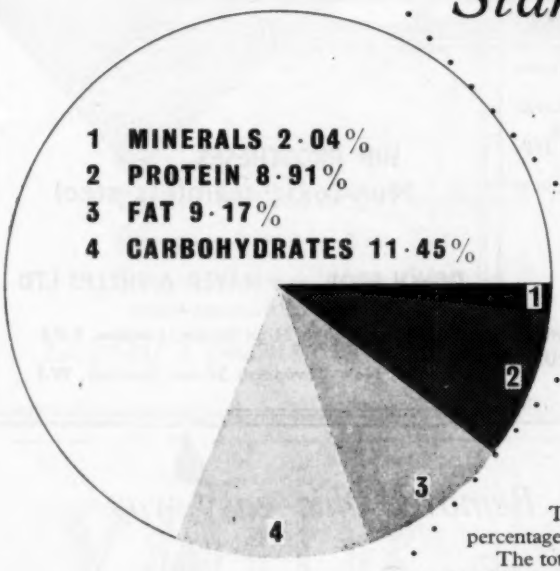

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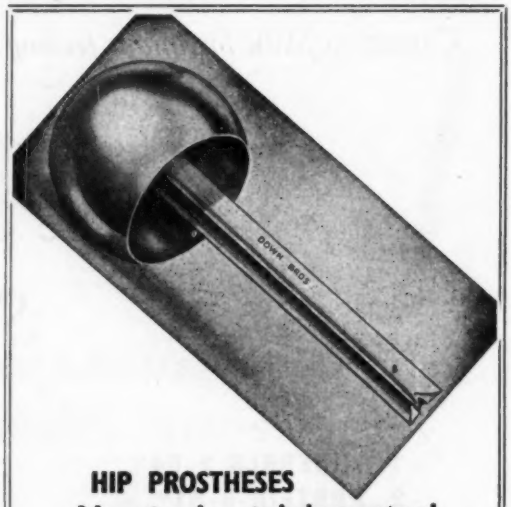

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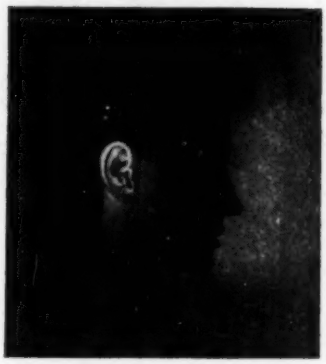

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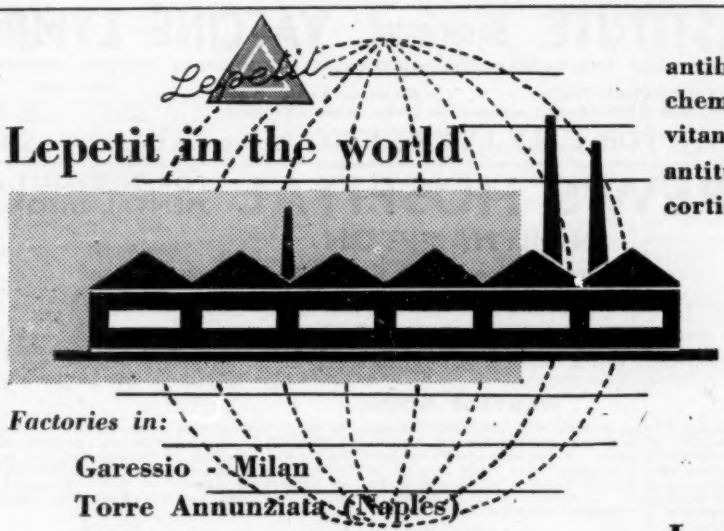

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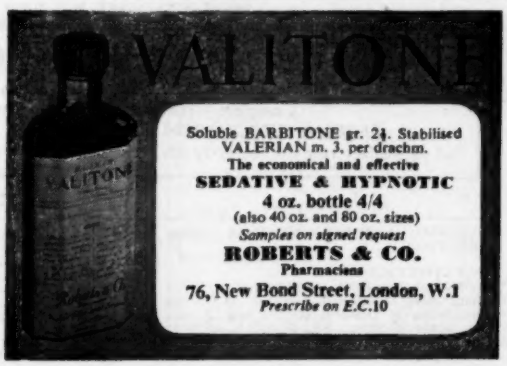

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

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EXAMINING BOARD IN ENGLAND
by the
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and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN PATHOLOGY
1st November

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE
7th November

DIPLOMA IN ANÆSTHETICS
15th November

DIPLOMA IN PSYCHOLOGICAL MEDICINE
29th November

DIPLOMA IN LARYNGOLOGY AND OTOLOGY
6th December

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

UNIVERSITY OF GLASGOW
and
ROYAL FACULTY OF PHYSICIANS AND SURGEONS
Postgraduate Medical Education Committee

CONFERENCE ON GASTRO-ENTEROLOGY FOR PHYSICIANS AND SURGEONS

A SPECIALIST CONFERENCE ON GASTRO-ENTEROLOGY will be held in the Royal Faculty of Physicians and Surgeons, 242, St. Vincent-street, Glasgow, and in the teaching hospitals of Glasgow from 26TH to 30TH NOVEMBER, 1956.

Monday, 26th November
9.45 A.M. . . Inauguration.
10.00 A.M. . . S. C. TRUELOVE (Oxford) : "The Treatment of Ulcerative Colitis."
11.30 A.M. . . Discussion.
Openers : W. I. CARD ; J. C. GOLIGHER ; A. B. KERR ; E. J. WAYNE ; B. LENNOX.
2.00 P.M. . . Operating Sessions.

Tuesday, 27th November
9.30 A.M. . . Symposium on "Peptic Ulcer."
Chair : C. F. W. ILLINGWORTH.
Openers : S. LAZARUS ; A. W. KAY ; A. R. CURRIE ; T. FERGUSON RODGER ; L. D. W. SCOTT ; A. SMITH ; A. P. M. FORREST ; W. T. IRVINE ; D. H. CLARK.
2.00 P.M. . . J. C. GOLIGHER (Leeds) : "Treatment of Carcinoma of the Colon."
3.00 P.M. . . Discussion.
Openers : A. B. KERR ; A. A. BONAR ; J. GALLOWAY ; R. B. WRIGHT.
4.00 P.M. . . Demonstrations.

Wednesday, 28th November
9.30 A.M. . . Operating Sessions.
2.00 P.M. . . Presentation of Cases.

THURSDAY, 29th November
9.30 A.M. . . W. I. CARD (Edinburgh) : "Gastro-intestinal Hormones : a Review."
10.30 A.M. . . Discussion.
Openers : S. ALSTEAD ; R. C. GARRY ; H. I. TANKEL ; A. SMITH ; D. H. CLARK.
12 NOON . . Film Hour.
2.30 P.M. . . Clinico-pathological Conference : T. SYMINGTON.

Friday, 30th November
9.30 A.M. . . Symposium : "Argentaffinoma."
Openers : A. SMITH ; B. LENNOX ; P. S. MACFARLANE.
10.30 A.M. . . Discussion : I. S. R. SINCLAIR ; C. F. W. ILLINGWORTH.
11.30 A.M. . . Panel Discussion : "Gastro-intestinal Problems."
Moderator : C. F. W. ILLINGWORTH.
Panel : W. I. CARD ; J. C. GOLIGHER ; A. W. KAY ; S. C. TRUELOVE ; W. A. MACKEY.
2.00 P.M. . . Outpatient Sessions.

There is no fee for the Course. Lunch will be available at a nominal charge in the Royal Faculty, except Wednesday, at 12.30 P.M. An informal dinner will be held on Thursday at 7 P.M. Further particulars may be obtained from the Registrar, Royal Faculty of Physicians and Surgeons, 242, St. Vincent-street, Glasgow, C.2.

TANCRED'S STUDENTSHIPS
DIVINITY : MEDICINE : LAW
£100 p.a. each. For men only

The Governors propose to elect 1 Student in Divinity at Christs College, Cambridge, on the result of the Scholarship Examinations to be conducted in DECEMBER, 1956, by the Queens, Christ's, St. Johns, Emmanuel and Sidney Sussex Group of Colleges in the University of Cambridge.

Candidates must have been born in England, Scotland or Wales, and be members of the Church of England and unmarried ; they must also be within the ages of 17 and 22 years.

Candidates should in addition to making the necessary arrangements with the Managers of the above Scholarship examinations send in a Petition to the Clerk to the Tancred Foundation by 1st November, 1956.

Further announcements relating to the Physic and Law Studentships awarded by this Foundation will appear in February and April, 1957.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R. M. C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

THE UNIVERSITY OF LIVERPOOL
DEPARTMENT OF ANÆSTHESIA
(In association with the Royal Liverpool Children's and Alder Hey Hospitals)

POSTGRADUATE COURSE IN PÆDIATRIC ANÆSTHESIA
19TH–24TH NOVEMBER, 1956

Lecture	*Lecturer*
Scope of Pædiatric Surgery	Miss I. FORSHALL
Child in Hospital	Dr. P. PINKERTON
Neonatal Physiology	Dr. G. JACKSON REES
Pre- and Post-operative Care of Neonates	Dr. A. STEAD
Metabolic response to Surgery and Fluid Therapy	Mr. P. P. RICKHAM
Neonatal Anæsthesia	Dr. G. JACKSON REES
Premedication	Dr. SHEILA ANDERSON
Pædiatric Anæsthesia—General Considerations	Dr. G. JACKSON REES
Anæsthesia for Major Pædiatric Surgery	Dr. A. STEAD
Radiology	Dr. NORAH WALKER
The E.C.G. and other Cardiac Investigations	Dr. JOHN HAY
Therapeutic Application of Anæsthetic Techniques, including Resuscitation of the Newborn	Panel discussion
Trends in Anæsthesia for Cardiac Surgery	Dr. T. CECIL GRAY

Demonstrations will be given each day.
Fee for the course, 10 guineas.
Applications, stating qualifications and present appointment should be forwarded to the Reader in Anæsthesia, The University of Liverpool, 48, Bedford-street North, Liverpool, 7. The course will be limited to 14 students and the closing date for applications will be 13th October, 1956.

MARLBOROUGH DAY HOSPITAL
38, Marlborough-place, N.W.8

Medical practitioners and professional people working in the mental health field are cordially invited to LECTURES on the first MONDAY of every month, at 8.15 P.M.

On MONDAY, 5TH NOVEMBER, 1956, the first Lecture is being given by Dr. OTHO FITZGERALD, Medical Superintendent, Shenley Hospital, Herts, who will be speaking on :
"A Few New Ideas in Mental Hospital Administration."

COLINDALE HOSPITAL, London, N.W.9

A CLINICAL COURSE will be held on 16TH, 17TH, and 18TH OCTOBER. Fee £3 3s. (excluding accommodation).

Further information from the Secretary, Tuberculosis Educational Institute, Tavistock House North, Tavistock-square, London, W.C.1.

DENTAL AND MEDICAL SOCIETY FOR THE STUDY OF HYPNOSIS

The above society will hold a STUDY GROUP on THE THEORY AND PRACTICE OF HYPNOSIS beginning on WEDNESDAY, 3RD OCTOBER, 1956. 2-hour lecture-demonstrations will begin at 7.15 P.M.

An INTENSIVE WEEKEND COURSE will be held on 24TH and 25TH NOVEMBER for members who live too far away from London to attend the full course.

A fee is charged for these Study Groups.

The Society is prepared to send a team of lecturers and subjects to any locality in Great Britain to give an intensive weekend course provided that sufficient Medical and Dental practitioners are willing to attend.

Further details may be obtained from the Secretary, Mr. DAWSON WATTS, 22, Gordon-road, Ealing, W.5.

NAPT CANADIAN SCHOLARSHIP 1957

Applications for the NAPT Canadian Scholarship 1957, should be sent to the Secretary-General before 31ST DECEMBER, 1956.

The value of the award is £350, and it is offered to a British Chest Physician to enable him to visit Canada for 3 months.

Full particulars may be obtained from the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock-square, London, W.C.1.

UNIVERSITY COLLEGE DUBLIN. Department of ANATOMY. Applications are invited for the position of ASSISTANT in our Anatomy Department. Applicants should be medical graduates or should be Science graduates with a scientific training in anatomy. The salary will be at a point on the scale £750–£50–£1200 in accordance with the experience and qualifications of the successful applicant.

Applications, giving details of degrees, qualifications and experience, should be addressed to the undersigned not later than 15th October, 1956. Names of 2 persons who may be contacted for references should be given.

J. P. MACHALE, Secretary and Bursar.

QUEEN'S UNIVERSITY, Kingston, Canada. Applications are invited for the post of LECTURER IN NEUROSURGERY. The appointee will also be Consultant in Neurosurgery at the Kingston General Hospital, and will receive appointments at Mental Hospitals associated with the University and the Department of Health of Ontario. He must take up his appointment within the next 2 years and might be required to undergo further postgraduate training before finally assuming the responsibility of the appointment.

Applications should be sent to the Professor of Surgery, Queen's University, Kingston, Ontario, together with 3 copies each of 6 testimonials and details of the candidate's education and service with the armed forces.

Hospital Services : Senior Appointments

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited for the post of Full-time PATHOLOGIST (Consultant) in charge of the Department of Morbid Anatomy.

Applications (12 copies), quoting age, education, experience, and giving the names of 3 referees, to reach the House Governor, by 29th October, 1956.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PSYCHIATRIST AND MEDICAL SUPERINTENDENT (resident), St. Margaret's Hospital, Birmingham (1491 Beds). Duties also at associated clinics. Wide experience specialty/D.P.M. required. All modern methods rehabilitation mental defectives practised.

Applications (15 copies), naming 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 15th October, 1956.

LEEDS REGIONAL HOSPITAL BOARD.

Whole-time CONSULTANT PSYCHIATRIST, specialising in Mental Deficiency, required for duties mainly at Westwood Hospital (520 Beds) and Ashfield House (50 Beds), Bradford, and associated with Stansfield View Hospital, Todmorden (160 Beds). Other duties may be required in the Halifax, Bradford (A), (B) and Bingley, Keighley, Skipton and Settle Groups. The person appointed will be Physician-Superintendent of the above-named hospitals and will be required to reside in Bradford. The duties include those of Medical Arbiter for the Mental Deficiency Area Admission Bureau, together with advising the Local Health Authorities on clinical aspects of mental deficiency as required. Applicants should hold the D.P.M., and have had experience in mental deficiency.

Part-time CONSULTANT in Dentistry (2 sessions per week) for duties mainly at Clayton Hospital, Wakefield, together with additional duties at other hospitals in the Wakefield, Pontefract, Dewsbury, and Goole areas.

Part-time CONSULTANT ANÆSTHETIST (9 sessions per week) for duties in the Halifax area. The person appointed to reside in Halifax.

Applications (12 copies), stating age, qualifications and details of appointments held showing dates, with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 20th October, 1956.

NEWCASTLE REGIONAL HOSPITAL BOARD.

Aycliffe Hospital Management Committee

Locum SENIOR HOSPITAL MEDICAL OFFICER PSYCHIATRIST (whole-time) for approximately 6 months. Single accommodation available.

St. George's Hospital Management Committee

Locum SENIOR HOSPITAL MEDICAL OFFICER PSYCHIATRIST (whole-time), for period up to 3 months. Married or single accommodation available.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Benfield-road, Newcastle upon Tyne, 6, immediately.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners having experience in clinical chemistry for the full-time post of CLINICAL PATHOLOGIST at Woodend General Hospital, Aberdeen. The officer appointed will be on the staff of the Aberdeen General Hospitals. The salary will be on the scale £1575–£50–£2025 p.a. with appropriate scale placing. Terms and conditions of medical and dental staffs as set up by regulations will apply to the post.

Applications (12 copies), together with the names of 2 referees, should be submitted before 22nd October, 1956, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer grade) based on the Inverness Hospitals. Candidates should have a higher qualification in anæsthetics.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by 15th October, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments :—

CONSULTANT SURGEON with an attachment to the Orthopædic Department at the Royal Infirmary, Glasgow, for duties mainly in the Casualty Department.

CONSULTANT ORTHOPÆDIC SURGEON at the Western Infirmary, Glasgow. The duties of the appointment will include supervision of the Casualty Department.

These appointments will be either whole-time or on a part-time basis of 9 notional half-days per week, and are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST required for Saxondale Hospital, Radcliffe-on-Trent, Notts. House available. Salary scale £1575–£50–£2025.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 20th October, 1956.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the post of Whole-time or maximum Part-time (9 notional half-days) CONSULTANT in Anæsthetics. Wide experience and F.F.A.R.C.S. essential.

Applications (16 copies), stating age, qualifications and experience, with the names of 3 referees, should be sent not later than 31st October, 1956, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1, from whom further particulars may be obtained.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) for the Mortlake and Kingston Chest Clinic areas (population 280,000) to work under the direction of the Consultant Chest Physician for these areas, who has the supervision and control of nominated beds. Duties will be primarily at Mortlake Chest Clinic. The appointment will be a joint one with the Surrey County Council. Previous experience in diseases of the chest is essential.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.I.), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 27th October, 1956. Applicants may visit clinics by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) for Redhill and Horsham (Crawley) Chest Clinic areas (population approximately 180,000 ; combined clinic registers 1100). Candidate appointed to work under the direction of the Consultant Chest Physician for these areas. Previous experience in diseases of the chest essential.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.I.), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 27th October, 1956. Applicants may visit clinics by local arrangement.

WELSH REGIONAL HOSPITAL BOARD. Consultant ANÆSTHETIST to serve Merthyr and Aberdare Hospital Management Committee. Based at Merthyr General Hospital. F.F.A.R.C.S. essential. Successful applicant required reside within Hospital Management Committee area. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

WELSH REGIONAL HOSPITAL BOARD. Consultant DERMATOLOGIST to serve Glantawe Hospital Management Committee area (Swansea), with visits to hospitals in neighbouring groups. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

NEW ZEALAND. THAMES HOSPITAL BOARD, THAMES, NEW ZEALAND. Applications are invited for the position of Whole-time MEDICAL SUPERINTENDENT of the Thames Hospital Board. Applicants must be registered, or entitled to be registered, as medical Practitioners in New Zealand. Surgical experience and a higher qualification in surgery is necessary. Salary, in accordance with the Hospital Employment Regulations, will be either of the following scales—£NZ1700 p.a.–£NZ2000 p.a. or £NZ2000 p.a.–£NZ2300 p.a. Within these scales the commencing rate and the maximum rate will be as determined by the Medical Officers' Salaries Grading Committee in accordance with the qualifications and experience of the appointee. Residential accommodation is available at a rental of £NZ110 p.a.

Conditions of appointment, application form and an explanatory memorandum are obtainable from the High Commissioner for New Zealand, 415, Strand, London, W.C.2, or the undersigned.

Applications, which should be sent air-mail, addressed to the undersigned, close on Wednesday, 24th October, 1956.

F. HOPKINSON, Secretary.
P.O. Box 53, Thames, New Zealand.

WESTERN AUSTRALIA. ROYAL PERTH HOSPITAL. Applications are invited from legally qualified medical practitioners for the full-time post of DIRECTOR OF ANÆSTHESIA. Salary £A3100 p.a. Conditions equivalent to State Public Service, including long service leave and provision for superannuation. The Royal Perth Hospital is the main Teaching Hospital associated with the University of Western Australia. Applicants must possess a Senior Degree in Anæsthesia or its equivalent. Inquiries regarding the Hospital's medical services should be addressed to the Medical Superintendent of this Hospital.

In addition to all relevant personal details, applications must include particulars of qualifications, experience, publications ; the names of 2 referees ; and should reach the undersigned on or before 31st October, 1956. JOSEPH GRIFFITH, Administrator.

Hospital Services : Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for the following posts :—

NON-RESIDENT HOUSE PHYSICIAN for which there are 3 vacancies, for 6 months from 1st December, 1956. Duties include work in Outpatient Department and wards, also 1 months duty at Frimley as occasion demands. Salary at the rate of £525 p.a.

RESIDENT HOUSE PHYSICIAN to Cardiac Department for 6 months from 1st December, 1956. Duties include work in Outpatient Department and wards. Salary at the rate of £525 p.a.

Applications, stating age, qualifications with dates, nationality and appointment held, together with copies of testimonials, by 6th October, 1956, to—

KENNETH A. F. MILES, House Governor.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEON (resident), required from 19th October, 1956. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 8th October, 1956.

CENTRAL MIDDLESEX HOSPITAL, N.W.10. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time RESIDENT PATHOLOGICAL REGISTRAR required, 1 year in first instance, to act as Transfusion Officer, assist the Consultant Hæmatologist, and take part in the 24-hour pathological service. Post vacant 15th October. Hospital may be visited by direct appointment.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 6th October, 1956.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-months resident appointment of CASUALTY OFFICER AND E.N.T. HOUSE SURGEON (House Officer grade) should be sent immediately to the Secretary, above address, quoting HH/CHO.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. A vacancy occurs 1st January, 1957, for REGISTRAR in Clinical Pathology (Registrar grade). The appointment (non-resident) is a whole-time one and will be for 1 year in the first instance.

Applications, stating date of birth, qualifications with dates, and previous experience, together with copies of 3 testimonials, should reach the undersigned not later than 15th October, 1956,

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. Applications are invited for the post of MEDICAL REGISTRAR. The appointment is for 1 year in the first instance and is non-resident. Duties include outpatients and refill clinic and attendance at the Country Branch, near Letchworth.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 15th October, 1956.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON CHEST HOSPITAL. 2 vacancies occur 1st December, 1956, for RESIDENT HOUSE PHYSICIAN. Appointment for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and post graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic, as well as in wards.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 23rd October.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

MIDDLESEX HOSPITAL, W.1, and THE CENTRAL MIDDLESEX HOSPITAL, N.W.10. Applications invited for post of SENIOR MEDICAL REGISTRAR, vacant 1st January. Appointment will involve transfer to the Central Middlesex Hospital for approximately half the total tenure.

Application forms obtainable from Deputy Superintendent, The Middlesex Hospital, should be returned, naming 2 referees, by 27th October.

MIDDLESEX HOSPITAL, W.1, and NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for post of REGISTRAR (Accident Officer) in the Orthopædic Department, vacant 1st January. Appointment for 1 year at The Middlesex Hospital and a second year at the Luton and Dunstable Hospital under the control of the North West Metropolitan Regional Hospital Board.

Rules and application forms obtainable from Deputy Superintendent, The Middlesex Hospital, should be returned, naming 2 referees, by 27th October.

MIDDLESEX HOSPITAL, W.1. Applications invited for posts of :—

CASUALTY MEDICAL REGISTRAR.
CASUALTY SURGICAL REGISTRAR.

Vacant 1st January.

Rules and application forms obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 27th October.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of TRANSFUSION OFFICER AND RESEARCH ASSISTANT to the Director of Surgical Studies (graded as Registrar), vacant 1st January.

Rules and application forms obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 27th October.

MILDMAY MISSION HOSPITAL, Austin-street, Bethnal Green, London, E.2. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER. Recognised for the F.R.C.S. Vacant 1st November, 1956. The appointment is for 1 year. Salary £745 p.a., less residential charges. Candidates should be in full sympathy with the evangelistic aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of ASSISTANT HOUSE PHYSICIAN (non-resident) at The National Hospital, Queen-square, W.C.1. The post carries the grade of Senior House Officer. The appointment will be for 6 months.

Applications, with names of 3 referees, to be sent to the undersigned not later than 27th October, 1956.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospital, Queen-square, London, W.C.1.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. (582 Beds.) Applications are invited for the post, commencing 1st November, 1956, of SENIOR HOUSE OFFICER (casualty), resident on duty (1 of 3). Recognised for F.R.C.S.

Applications, stating age, qualifications, experience together with names and addresses of 2 referees, to Secretary to Committee by 10th October, 1956.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, HOUSE SURGEON (pre-registration post). Duties include inpatient, outpatient and casualty work. Recognised for F.R.C.S. Vacant 19th October, 1956.

Applications, stating age, nationality and qualifications, to the Hospital Secretary not later than 8th October.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. JUNIOR OBSTETRIC OFFICER (Senior House Officer), resident post, tenable for 6 months from 1st January, 1957.

Applications to the Secretary to the Board of Governors by 13th October, 1956, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. CHELSEA HOSPITAL FOR WOMEN. HOUSE SURGEON (Senior House Officer), resident post, tenable for 1 year from 1st December, 1956.

Applications to the Secretary to the Board of Governors by 13th October, 1956, on forms obtainable from 339, Goldhawk-road, London, W.6.

ROYAL FREE HOSPITAL. Applications are invited for the post of REGISTRAR to the X-ray Department of the Royal Free Hospital. The post is non-resident, for 1 year in the first instance. Duties to commence 1st November, 1956. Candidates should be registered medical practitioners of not more than 10 years standing and should hold the D.M.R.(D.).

Formal applications, giving details of experience, &c., together with 3 testimonials, should be sent to the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 30th September, 1956.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applicat'ons are invited for the post of CASUALTY OFFICER (Senior House Officer grade), with duties in the E.N.T. Department, vacant mid-October, 1956. Post recognised for F.R.C.S.

Applications to be sent to the Hospital Secretary by 6th October, 1956.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE SURGEON (Senior House Officer) to above Hospital for a period of 6 months from 17th November, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 20th October, 1956.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE SURGEON (third post) to above Hospital for a period of 6 months from 18th November, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 20th October, 1956.

ST. CLEMENT'S HOSPITAL, E.3. Bow Group Hospital MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (not pre-registration) for general medical wards.

Applications, stating age, qualifications, and experience, together with the names and addresses of 2 referees, to be sent to the Hospital Secretary, St. Clement's Hospital, 2a, Bow-road, London, E.3.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior HOUSE OFFICER (anæsthetics), vacant early November. Recognised for F.F.A.R.C.S. and D.A. 6 months appointment and may then be renewed. Salary £745 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Registrar grade) required for St. Philip's Hospital on 1st December, 1956. Appointment for 6 months with opportunity for extension.

Apply in writing (12 copies), and names of 2 referees, to the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2. Closing date 31st October, 1956.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. HOUSE SURGEON (obstetrics and gynæcology). Post recognised for D.Obst.R.C.O.G. in Obstetrics. Appointment commences 1st November, 1956, is resident and limited to 6 months.

Applications by 8th October, 1956, on forms obtainable from Hospital Secretary (L.130).

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. SENIOR HOUSE OFFICER (Casualty Officer) resident or non-resident. Post vacant 29th October, 1956. Post recognised for F.R.C.S. (Eng.). Candidates may visit the Hospital by arrangement with the Surgeon-Superintendent.

Applications by 8th October, 1956, on forms obtainable from the Hospital Secretary (L.131).

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of Part-time REGISTRAR to the Psychiatric Department (5 notional half-days per week). Previous experience in psychiatry is necessary ; preference will be given to candidates holding the D.P.M. The appointment will be for a first period of 12 months as from a date to be arranged ; remuneration at Registrar rates.

Applications, stating nationality, date of birth, permanent address, qualifications, with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 10th October, 1956.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of Whole-time REGISTRAR in the Allergy Clinics (Wright Fleming Institute of Microbiology). Preference will be given to candidates with previous experience in this specialty. The appointment is for a first period of 12 months as from 1st December, 1956; remuneration to be at Registrar rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates; details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 16th October, 1956.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited from suitably qualified Male candidates for the post of Whole-time REGISTRAR in the Venereal Diseases Department. The appointment is for a first period of 12 months as from a date to be arranged, the holder being eligible for re-election.

Applications, stating nationality, date of birth, qualifications, details of experience, together with dates and National Health Service gradings of previous and present appointments and names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 8th October, 1956.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Medical REGISTRAR to the Department of Physical Medicine in the Chelsea Group of hospitals. Duties include working in the Rheumatic Unit at St. Stephen's and the Geriatric Department at St. Luke's Hospital. Non-resident. Recognised for Part II of the D.Phys.Med.

Application forms obtainable from the Secretary, St. Luke's Hospital, S.W.3.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for the following Senior House Officers on 15th January, 1957.

2 HOUSE PHYSICIANS.
2 HOUSE SURGEONS.

Further particulars and form of application, which must be returned not later than Monday, 5th November, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There is a vacancy for a NON-RESIDENT SURGICAL OUTPATIENT ASSISTANT (grade: Senior Registrar), attending on Saturday mornings.

Full particulars and form of application, which must be returned not later than 22nd October, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. RESIDENT HOUSE OFFICER (paediatrics, E.N.T., ophthalmic, dental and dermatology) required 17th November.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, by 8th October.

WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1. Applications invited for post of SENIOR HOUSE OFFICER to Radiotherapy Department for 1 year from 1st December, 1956.

Applications (7 copies), with names of 2 referees, to House Governor by 13th October.

WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1. Applications invited for post of SENIOR MEDICAL REGISTRAR for 1 year in first instance from 1st November, 1956. Candidates must be M.R.C.P. (London).

Applications (11 copies), with names of 2 referees, to House Governor by 13th October.

WHITTINGTON HOSPITAL, London, N.19. Registrar in Physical Medicine (non-resident), vacant now. This post affords wide general experience in all branches of physical medicine and is recognised for Part II of the D. Phys. Med. Hospital may be visited by appointment with the Medical Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, within 10 days.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for Special Departments (E.N.T., pædiatric, dermatology, &c.). 6 months appointment, vacant 15th October, 1956. Not suitable for pre-registration candidates; offers good experience before general practice.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON (Male) for Traumatic and Orthopædic Unit on 1st November, 1956. 6 months appointment suitable for pre-registration candidates.

Applications, stating age, qualifications and experience with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for general surgical and medical duties. 6 months appointment, not suitable for pre-registration candidates.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. ROSSENDALE GENERAL HOSPITAL, RAWTENSTALL. Applications are invited for the post of SENIOR HOUSE OFFICER in Medicine at the above Hospital.

Apply, stating age, experience, qualifications, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. (340 Beds—Adults and Children.) SENIOR ORTHOPÆDIC REGISTRAR required, whole-time, resident. Post available for 1 year and is approved by the British Postgraduate Medical Federation to give Senior Orthopædic Registrars an opportunity of spending 1 year in an active Orthopædic Hospital with many long-stay orthopædic patients. Attendance necessary at peripheral clinics. Quarters for a single man: unfurnished 3-bedroom house for married man. Canvassing disqualifies but visit to Hospital (by appointment) welcomed.

Application form from Secretary.

BANGOR. ST. DAVID'S HOSPITAL. (Specialist Hos-pital for Women and Children.) Applications are invited for the post of RESIDENT PÆDIATRIC OFFICER (Senior House Officer grade). Preference will be given to candidates with previous experience in neonatal and premature infant care. The Pædiatric Unit is recognised for the D.C.H. Salary according to scale.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, should be forwarded within 10 days of the appearance of this advertisement to the Group Secretary, Caernarvon and Anglesey Hospital Management Committee, Plas Gwyn, Ffriddoedd-road Bangor, North Wales.

BASINGSTOKE. PARK PREWETT HOSPITAL. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR PSYCHIATRIC REGISTRAR at Park Prewett Hospital (1490 Beds). Candidates should possess the D.P.M. and have had considerable experience in psychiatry. Residential accommodation is available to a single man.

Application forms can be obtained from the Group Secretary, Park Prewett Hospital, and should be returned not later than 14 days after the appearance of this advertisement. Applicants may visit the Hospital by appointment.

BEDFORD GENERAL HOSPITAL. (439 Beds.) House SURGEON required (mainly orthopædic). Pre- or post-registration; recognised for F.R.C.S. Vacant mid-October. Post offers exceptional opportunities for general experience in busy acute surgical units.

Inquiries and applications, with copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (439 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. GENERAL SURGICAL REGISTRAR (resident) required at above Hospital which may be visited by direct appointment. Post vacant October.

Application forms obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, as soon as possible.

BEXHILL-ON-SEA. BEXHILL HOSPITAL. (62 Beds.) 2 HOUSE SURGEONS (resident), posts vacant 18th October. 1 pre-registration. National scale of salary.

Apply to Hospital Administrator.

BIRMINGHAM. ST. CHAD'S HOSPITAL. Resident SURGICAL REGISTRAR (50 general surgical beds). Recognised for F.R.C.S. Higher qualification an advantage. Married accommodation.

Application forms from Secretary, Dudley Road Hospital, Birmingham, 18, to be returned before 8th October, 1956. Candidates may visit Hospital.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited from registered medical practitioners for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty with the Professorial Unit from 1st December, 1956. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms, obtainable from the House Governor at the above address, to be returned not later than 6th October, 1956. G. A. PHALP, Secretary.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Clinical Pathology. This Officer will act as 1 of 4 blood-bank officers in addition to routine work in the department. Previous experience in clinical pathology is not essential but applicant should have had hospital postgraduate experience. The appointment is tenable for 1 year.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade) for duties in the United Hospitals (resident at either the General or the Queen Elizabeth Hospital). The post is tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A.R.C.S. examination.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE, HANTS. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER for E.N.T. and Ophthalmic duties. The appointment which became vacant on 22nd September, 1956, is recognised for the D.O. and D.L.O. Diplomas. In addition to duties at the above Hospital, the successful candidate will be required to assist in E.N.T. outpatient clinics at the Royal Victoria Hospital, Shelley-road, Bournemouth, and Poole General Hospital, Poole.

Applications to the Hospital Secretary, Royal Victoria Hospital, Shelley-road, Bournemouth.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON, vacant 5th November, 1956. The appointment is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEONS (3) required for the following hospitals :—

Royal Infirmary, Blackburn (262 general beds)—28th October and 1st November.

Queen's Park Hospital, Blackburn (640 mainly general beds)—1st November.

Applications to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR (anæsthetics) required. Resident post. Married accommodation available if desired. Duties mainly at Blackburn Royal Infirmary with sessions at Victoria Hospital, Accrington, and Queen's Park Hospital, Blackburn, as arranged by Consultant-in-charge. Post recognised for D.A. and F.F.A.R.C.S.

Application forms available from Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum REGISTRAR in Ophthalmology at the Sussex Eye Hospital as from 5th November until about 31st December, 1956.

Applications, with details of previous experience, qualifications and names of 2 referees, to be sent immediately to Group Secretary, Brighton and Lewes Hospital Management Committee, Royal Sussex County Hospital, Brighton, 7. (Brighton 29155.)

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.)

2 HOUSE SURGEONS required mid- and end-October.

2 HOUSE PHYSICIANS required mid-October and mid-November.

All posts recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL (near). HAM GREEN HOSPITAL, Pill, near BRISTOL. Applications are invited for the post of SENIOR HOUSE OFFICER in the tuberculosis wards (188 Beds) of the above Hospital. The Hospital is fully equipped for the modern treatment of pulmonary tuberculosis including regular major thoracic surgery. Appointment for 1 year renewable.

Applications to Secretary, Ham Green Hospital, Pill, near Bristol.

BRISTOL (near). HAM GREEN HOSPITAL, Pill, near BRISTOL. Applications are invited for the post of RESIDENT ASSISTANT PHYSICIAN in the Infectious Disease Department (350 Beds) of this Hospital. The Hospital contains a major Poliomyelitis Unit, a Tuberculous Meningitis Treatment Centre, and offers wide experience in acute medicine. Salary and conditions on Junior Hospital Medical Officer scale.

Applications, stating age, qualifications, &c., to the Group Secretary, Ham Green Hospital, Pill, Bristol.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Required immediately at Southmead Hospital (571 Beds, including 133 maternity) RESIDENT SENIOR HOUSE OFFICER (pathology). General experience in clinical pathology, including blood-transfusion duties. (There is a possibility of a further years appointment with basic training in morbid anatomy.)

Applications to be submitted to the Group Secretary, Southmead Hospital, Bristol.

BURTON UPON TRENT GENERAL HOSPITAL. Junior HOSPITAL MEDICAL OFFICER (orthopædic) required at the above Hospital. Duties include supervision of Casualty House Officer.

Applications to Group Secretary.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Senior MEDICAL REGISTRAR for 1 year in first instance, reviewable annually. Accommodation can be made available for married man if required.

Apply, with full particulars and names of 3 referees, to Secretary by 13th October. Interviews end October.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Non-RESIDENT RADIOTHERAPEUTIC REGISTRAR in the grade of Senior Registrar, now vacant. D.M.R.T. essential.

Apply, with full particulars and names of 3 referees, to Secretary by 13th October.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of GENERAL SURGICAL AND ORTHOPÆDIC HOUSE SURGEON, which is recognised for the F.R.C.S. Diploma, is now vacant. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY (near). ST. AUGUSTINE'S HOSPITAL, CHARTHAM, near CANTERBURY. JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female) required at this Mental Hospital. Salary scale £775–£1075 p.a. Accommodation is available. The post offers experience in all branches of psychiatry, including all forms of modern treatment and outpatient clinics. The Hospital has a high admission-rate and is recognised for the D.P.M.

Apply to the Physician-Superintendent.

CARDIFF. ST. DAVID'S HOSPITAL. Senior House OFFICER urgently required at Accident Unit at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. ST. DAVID'S HOSPITAL. Senior House OFFICER (non-resident) required in Casualty Department of above Hospital on 15th October, 1956.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of Locum SENIOR REGISTRAR in Medicine at the Cardiff Royal Infirmary. The appointment, to commence as soon as possible, is for the period of the present holder's emergency service in the Armed Forces.

Application forms are obtainable from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF (near). PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required. Regional Orthopædic Centre for South Wales area of 220 Beds increasing to 290 and branch of 70 Beds. Outpatient clinic in Cardiff. Single accommodation at hospital at Rhydlafar.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

CARDIFF (near). CAERPHILLY DISTRICT MINERS HOSPITAL. (226 general beds.) SENIOR HOUSE OFFICER (general surgery).

Apply to Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glam.

CARLISLE. GARLANDS HOSPITAL. (1060 Beds.) GARLANDS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER at the above Mental Hospital. Salary £745 p.a. Flat is available for which a deduction will be made. Appointment is subject to the National Health Service superannuation regulations and to the conditions and terms of service laid down by the Minister of Health.

Applications, stating age, qualifications and experience, and the names of 2 referees, should be sent to the Medical Superintendent as soon as possible.

CARSHALTON. QUEEN MARY'S HOSPITAL FOR CHILDREN. (853 Beds.) ORTHOPÆDIC REGISTRAR, with some surgical duties, required. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, which should be made on forms obtainable from the Group Secretary, should be returned immediately.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 3rd October, 1956. 100 orthopædic beds. Senior House Officer or House Officer (intern grade). Post recognised for F.R.C.S. and Pre-registration Service. Preference given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CLACTON AND DISTRICT HOSPITAL, Clacton-on-Sea. (58 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (188 Beds)

SENIOR HOUSE OFFICER (casualty and E.N.T.).

SENIOR HOUSE OFFICER (casualty and radiotherapy).

Posts recognised for F.R.C.S. ; tenable for 6 months or 1 year.

SENIOR HOUSE OFFICER (anæsthetics). The successful candidate will be called upon to give anæsthetics in other hospitals in the Group. Post recognised for F.F.A.R.C.S. and D.A. ; tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

COLCHESTER. SEVERALLS HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required (resident or non-resident). Commencing salary £775 p.a., rising to £1075 p.a. Furnished accommodation available for a single officer. There will be scope for work in the use of modern psychiatric methods in the wards.

Applications, with names of 2 referees, should be forwarded to the Medical Superintendent.

COVENTRY AND WARWICKSHIRE HOSPITAL. Senior HOUSE OFFICER (fracture and orthopædics), resident, vacant 30th October. Recognised F.R.C.S.

Applications to Secretary, Group 20 Hospital Management Committee, Stoney Stanton-road, Coventry.

COVENTRY AND WARWICKSHIRE HOSPITAL. (354 Beds.) HOUSE SURGEON (general surgery with some orthopædic duties), pre-registration, resident. Vacant 31st October, 1956.

Apply to Hospital Secretary.

CROYDON GENERAL HOSPITAL. (200 Beds.) Casualty OFFICER (Senior House Officer—resident). Post vacant 22nd October, 1956. Recognised for Final F.R.C.S. examination. There is a Registrar in charge of Department.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Croydon Hospital Management Committee, General Hospital, Croydon.

CROYDON GENERAL HOSPITAL. House Surgeon (pre-registration) required as from 10th November, 1956. Post recognised for F.R.C.S.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

CROYDON GENERAL HOSPITAL. (200 Beds.) Senior CASUALTY OFFICER (Registrar status). Post vacant. Busy Department. Post recognised for Final F.R.C.S. examination. Accommodation may be inspected on application to Hospital Secretary.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon.

CROYDON. MAYDAY HOSPITAL. (611 Beds.) Surgical REGISTRAR (whole-time) resident when on duty. Post vacant early in November. Candidates should have good medical and surgical background and preferably in possession of higher surgical qualification. There are 2 surgical teams at Hospital. Post recognised for Final F.R.C.S. examination.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Croydon Hospital Management Committee, General Hospital, Croydon.

CROMER AND DISTRICT HOSPITAL, Norfolk. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer status). Post vacant October, 1956, at a salary of £745 p.a., in accordance with conditions of service issued by the Ministry of Health. This is a busy general hospital of 50 Beds which has a pre-convalescent annexe of 64 Beds and an Outpatient Department where Consultants in all the major specialties hold regular sessions. The appointment thus offers practical experience of an all-round kind particularly useful to those contemplating entry into general practice. Residential accommodation available or furnished flat for married man.

Applications, stating age, qualifications, experience, sex, and the names of 2 referees, should be addressed to the Secretary, Cromer Area Hospital Management Committee, Cliff-avenue, Cromer.

CROWTHORNE, BERKSHIRE. BROADMOOR INSTITUTION. (920 Beds for persons of unsound mind of criminal tendencies.) SENIOR REGISTRAR. House or quarters available.

Applications, naming 3 referees, to Medical Superintendent by 13th October, 1956. Candidates may visit Hospital by appointment.

DARLINGTON (near). AYCLIFFE HOSPITAL FOR MENTAL DEFECTIVES, HEIGHINGTON, near DARLINGTON, CO. DURHAM. Temporary JUNIOR HOSPITAL MEDICAL OFFICER (Female or Male), required for an approximate period of 6 months commencing on 1st October, 1956, at the above Hospital. Salary £17 10s. per week, residential accommodation available for which an amount of £3 per week will be deducted.

Applications to the Medical Superintendent.

T. H. ALLAN, Group Secretary.

DENBIGH. THE NORTH WALES HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER required. A house on the Hospital estate or single quarters available. The Hospital has modern treatment facilities, and is recognised by the Conjoint Board for the purpose of their D.P.M. examination.

Applications, with names of 2 referees, to the Medical Superintendent.

S. L. FROST, Secretary to the Management Committee.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds. Post recognised for D.A.) **SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time RESIDENT REGISTRAR (anæsthetics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th October, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DEVIZES, WILTSHIRE. ROUNDWAY HOSPITAL. (For Nervous and Mental Diseases—1334 Beds.) Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER for duty at the above Mental Hospital. All forms of modern treatment available, including Insulin Unit and outpatients clinics at 3 General Hospitals. Salary £775 p.a. rising by £50–£1075 p.a. Accommodation for a single man for which £170 p.a. will be charged, or furnished house for a married man available at a rent of £3 per week plus rates.

Applications, giving names and addresses of 2 referees, to the Medical Superintendent as soon as possible.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the pre-registration post of HOUSE OFFICER (general surgery) which is available immediately.

Applications, giving full details and the names of 3 referees, should be sent to the Administrative Officer at the Hospital.

DONCASTER HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (Senior House Officer) required between Western Hospital, Doncaster, and Doncaster Royal Infirmary. Resident at Western Hospital. Post vacant towards end of October.

Applications to the Group Secretary at Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST in the grade of Senior House Officer. Post recognised under the regulations for the D.A. Duties to commence beginning of October

Applications to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

ENFIELD, MIDDLESEX. WAR MEMORIAL HOSPITAL, CHASE SIDE. RESIDENT SENIOR HOUSE OFFICER required for general medical and surgical duties in this Acute General Hospital of 61 Beds. Vacant mid-October. 12 months appointment. Deduction of £150 p.a. for residential emoluments.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

DORCHESTER. DORSET COUNTY HOSPITAL. West DORSET GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SURGICAL REGISTRAR (Registrar grade) at above Hospital. Salary according to experience, with a deduction at the rate of £170 p.a. for residence. Canvassing will disqualify, but Hospital may be visited by arrangement.

Application form, obtainable from Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, Dorset.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Psychiatry, Hellesdon Hospital, Norwich. Associated with this modern mental hospital (960 Beds) are a separate early treatment hospital with an Electro-encephalographic Department, outpatient clinics for both adults and children, and a special unit for the elderly mentally infirm. Recognised for D.P.M. House available.

Applications, stating age, experience, and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 8th October, 1956. Candidates invited to visit Hospital by direct arrangement with Medical Superintendent.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT PÆDIATRIC HOUSE PHYSICIAN for above Hospital. Post vacant 19th November, 1956. 6 months appointment.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 6th October, 1956.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) Ortho-PÆDIC SENIOR HOUSE OFFICER required immediately for 1 year. Recognised for F.R.C.S. Deduction for residence £150.

Apply, stating age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer.

GLASGOW ROYAL INFIRMARY. Senior House Officer in E.N.T. Surgery. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 4th October, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW VICTORIA HOSPITALS. Senior House OFFICER required for the Sectoral Bacteriological Laboratory at Mearnskirk Hospital with duties in the Victoria Infirmary. No previous laboratory experience necessary.

Applications, with names of 2 referees, to the Secretary, Board of Management for Glasgow Victoria Hospitals, 24, St. Vincent-place, Glasgow, C.1.

GLOUCESTER. HORTON ROAD AND CONEY HILL HOSPITALS. (1450 Beds.) Applications invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER. Hospital serves the North Gloucestershire Clinical Area including Gloucester, Cheltenham, Stroud and Forest of Dean. High admission-rate (800). All modern methods of treatment. New units provided for treatment of neurosis and alcoholism. Expanding outpatient services, long-stay annexes, and social clubs. Encouragement and opportunity for study. Salary and conditions Whitley Council. Single accommodation available. Married accommodation a possibility.

Applications, with names of 3 referees, to Physician-Superintendent within 14 days.

GREENOCK, RAVENSCRAIG (MENTAL AND GENERAL) HOSPITAL. (472 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident post). Mental and general experience to be gained. Hospital is recognised as a training centre for the D.P.M. examination.

Applications, in writing, to the Physician-Superintendent as soon as possible.

GUILDFORD GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. The post of Full-time REGISTRAR to the Orthopædic and Traumatic Unit (60 Beds) serving the Group will become vacant on 8th November, 1956. The appointment is for 1 year in the first instance and may be renewed for a further year. It is non-resident and the candidate appointed will be required to live within a short distance of Royal Surrey County Hospital. The post provides good facilities for training and experience in short-term orthopædic and traumatic surgery. The Hospital may be visited by arrangement.

Application forms from Group Secretary, St. Luke's Hospital, Guildford, to whom they should be returned by 13th October, 1956.

HASLEMERE AND DISTRICT HOSPITAL. Guildford GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of Locum RESIDENT SENIOR HOUSE OFFICER (with possibility of 12 months appointment). Post vacant 6th November, 1956. Mainly surgical but with charge of 12 medical beds. Busy General Hospital with easy access to London. Good experience in general and emergency surgery, orthopædic, E.N.T., gynæcological, children, and casualty work. Excellent post for those wishing to enter general practice.

Applications to Hospital Secretary, Haslemere and District Hospital, Haslemere, Surrey.

HOLT, NORFOLK. KELLING HOSPITAL AND DEPARTMENT OF THORACIC SURGERY. Applications are invited for the appointment of Locum JUNIOR HOSPITAL MEDICAL OFFICER (minimum of 4 months). This Hospital (180 Beds) deals with tuberculous and non-tuberculous chest conditions and offers excellent experience in chest medicine and thoracic surgery.

Applications, stating age, sex, qualifications, nationality, and experience, together with names of 2 referees, to the Group Secretary, Cromer Area Hospital Management Committee, Cliff-avenue, Cromer, Norfolk, who will be pleased to supply any other information concerning the appointment.

HITCHIN. LISTER HOSPITAL. (317 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR required at above Hospital. Preference will be given to applicants having experience in medical emergencies. Post vacant 1st December, 1956. Hospital may be visited by direct appointment.

Application forms obtainable from Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, and returnable by 16th October, 1956.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HOUSE SURGEON to the Gynæcological and Abnormal Maternity Department required to commence duties on 1st November, 1956. The post is recognised for the D.Obst.R.C.O.G. and is a pre-registration appointment. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
Huddersfield Hospital Management Committee,
The Royal Infirmary, Huddersfield.

HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required in the E.N.T. Departments of the Victoria Hospital for Sick Children, and the Hull Royal Infirmary. This post is recognised for the F.R.C.S. and D.L.O.

Applications, with testimonials, should be sent to the Hospital Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration). Recognised for the F.R.C.S. examinations. Busy acute General Surgical Unit. Vacant 1st October.

Applications, with 2 recent testimonials, to the Hospital Secretary.

IPSWICH GROUP CHEST HOSPITALS. Senior House OFFICER for duties in the above Hospitals. Suitable for a doctor reading for higher qualifications with special interest in chest complaints. Will be required to reside alternately at Foxhall Hospital, Ipswich (102 Beds) for investigation and treatment of all chest diseases, where duties in the Major Surgical Unit will be involved, and Nayland (British Legion) Hospital, near Colchester (124 Beds for tuberculous and non-tuberculous pulmonary disease). Furnished quarters available.

Further details from Dr. G. R. MCNAB, Physician-Superintendent, Foxhall Hospital, Ipswich, to whom applications, with recent testimonials, should be sent.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICER required for Admissions and Casualty Department. Must have held medical and surgical post.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 9th October, 1956.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (112 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital.

Applications, with the names of 3 referees, to the Hospital Secretary.

LANCASTER. BEAUMONT HOSPITAL, Blyne-road. PÆDIATRIC REGISTRAR (resident). Previous paediatric experience essential. Duties include experience in children's medical ward, in Neonatal unit, and pediatric outpatient clinics. Unit recognised for D.C.H. Candidates may visit Hospital by direct appointment.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Bradford A and B Groups, preferably resident. Recognised for the F.F.A.R.C.S. Approximately 700 Beds in the surgical specialties. Establishment 1 Senior Registrar and 2 Registrars.

Chest Diseases

Leeds Chest Clinic and additional duties, as required at Regional Sanatoria. Previous experience in diseases of the chest desirable. Accommodation for a single person only at Killingbeck Hospital.

General Surgery

(*a*) Hull Royal Infirmary (80 general surgical beds) and other hospitals in the Hull A Group. Non-resident. Includes additional duties in the Casualty Department.

(*b*) Halifax Group. 1 of 3 similar posts. Duties divided approximately between general and orthopædic surgery (195 general surgical and 85 orthopædic beds). May include some duties in the Casualty Department. Preferably resident.

(*c*) Harrogate and District General Hospital (65 general surgical beds). Preferably resident. Recognised for F.R.C.S.

Orthopædic Surgery

St. James's Hospital, Leeds (64 orthopædic beds) and the Public Dispensary, Leeds. Non-resident.

Psychiatry

Scalebor Park Hospital (300 Beds). Annual admission-rate 350–400. Accommodation available for single person. Facilities for attendance at Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 12th October, 1956.

LEEDS REGIONAL HOSPITAL BOARD. Locum Tenens REGISTRAR in Anæsthetics required immediately in Leeds for approximately 6 weeks.

Applications, with full details, to the Secretary, Park-parade, Harrogate.

LEICESTER GENERAL HOSPITAL. Locum Senior HOUSE OFFICER required n Obstetrics and Gynæcology for at least 1 month.

Applications, with copies of testimonials, to Secretary as soon as possible.

LEICESTER. GENERAL HOSPITAL. (Post recognised for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th October, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEICESTER. GENERAL HOSPITAL. (454 Beds. Recognised for training for M.R.C.O.G.) SHEFFIELD REGIONAL HOSPITAL BOARD. RESIDENT or NON-RESIDENT REGISTRAR (obstetrics and gynæcology) required. Appointment for 1 year in the first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th October, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEICESTER ROYAL INFIRMARY. Applications are invited for the posts of SENIOR HOUSE OFFICER (pathology) (2) vacant 1st October. The posts are recognised for D.Path. and D.C.P.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, to the Group Secretary, No. 1 Hospital Management Committee, The Leicester Royal Infirmary, forthwith.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a temporary appointment of REGISTRAR in Surgery for the period to 30th September, 1957, for duty at the Liverpool Royal Infirmary.

Apply by 13th October, 1956, on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LUTON, BEDFORDSHIRE. ST. MARY'S HOSPITAL. SENIOR HOUSE OFFICER (resident) required 17th October, 1956. (129 Beds mainly for Chronic Sick and 33 Beds for Chest Diseases.)

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to be sent to the Secretary, Luton and Hitchin Hospital Management Committee, St. Mary's Hospital, Luton, as soon as possible.

MANCHESTER. MONSALL HOSPITAL, Newton Heath, MANCHESTER, 10. RESIDENT SENIOR HOUSE OFFICER required for infectious diseases hospital, which is a Regional Centre for Poliomyelitis. There are also 150 Beds for the treatment of tuberculosis and other chest diseases.

Applications, with names of 2 referees, to Deputy Group Secretary, Monsall Hospital, from whom further particulars may be obtained.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for REGISTRAR in Surgery at Bury General Hospital. Post recognised for F.R.C.S.

Applications, together with the names of 2 referees, should be sent to R. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of Whole-time RESIDENT SURGICAL REGISTRAR to the West Manchester Hospital Management Committee, with duties primarily at Park Hospital, Davyhulme, but with duties at other hospitals within the Group. Post now vacant. 12 months appointment subject to renewal.

Forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of Whole-time REGISTRAR in General Medicine to the West Manchester Hospital Management Committee, primarily for duty at Park Hospital, Davyhulme, but with duties at other Group Hospitals. Post vacant mid-November. 12 months appointment in first instance.

Forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. WYTHENSHAWE HOSPITAL, MANCHESTER, 23. The Board invite applications from registered practitioners for the post of MEDICAL REGISTRAR at the above Hospital.

Applications, stating age, qualifications, present post, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the following posts :—

SENIOR HOUSE OFFICER.
HOUSE OFFICER (pre-registration surgical post).

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.
Manchester Royal Eye Hospital.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Department of Cardiology, to commence on 4th January, 1957. Whole-time non-resident post, tenable for 1 year, renewable for a further year.

Application form obtainable from the undersigned, to be returned not later than 3rd October, 1956.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13 SENIOR HOUSE OFFICER in the Department of Anæsthetics to commence on 28th January, 1957. Whole-time resident appointment for 6 months, renewable for a second and possibly a third 6 months. Residence £155 p.a.

Application form obtainable from the undersigned, to be returned by 6th October 1956. G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR REGISTRAR to a General Surgical Unit, to commence as soon as possible. Whole-time appointment for 12 months, renewable. Applicants must possess a higher qualification. Arrangements may eventually be made for the successful candidate to transfer to 1 of the Manchester Regional Hospitals to continue training.

Application form obtainable from the undersigned, to be returned by 6th October, 1956.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics, vacant 1st January, 1957. Applicants must have had previous hospital experience in general medicine and surgery, and in obstetrics. The post is recognised for the purpose of the M.R.C.O.G. examination. The duties involve clinical responsibility for mothers and babies and supervision of the work of pre-registration House Officers is also included. The appointment is for 12 months. National scale.

Application forms may be obtained from the undersigned and returned not later than 15th October, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. Applications are invited from suitably qualified and experienced Male or Female candidates for RESIDENT SURGICAL REGISTRAR (Thoracic Unit). This Hospital is a General Hospital of 433 Beds. It carries out by far the major part of the Manchester Region's cardiac and non-tuberculous thoracic surgery, in addition to all other major specialties. The total number of resident medical staff is 20. The successful candidate will be expected to work with each of the 3 Consultant Thoracic Surgeons attached to this unit of 50 Beds (including 10 children's beds).

Application forms from the Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (general surgery) required. Post vacant end-November.

Application forms from Secretary.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL, ANNEXE AND E.N.T. DEPARTMENT. (183 Beds.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical). This appointment affords excellent experience to suitably qualified candidates. Post recognised under F.R.C.S. regulations.

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MEXBOROUGH. MONTAGU HOSPITAL. (168 Beds. Recognised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th October, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGIONAL BLOOD TRANSFUSION SERVICE. MEDICAL OFFICER (Junior Hospital Medical Officer) whole-time. Centre located in new Institute of Pathology at Newcastle General Hospital.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD.

St. George's Hospital Management Committee

Locum REGISTRAR PSYCHIATRIST (whole-time), for approximately 6 months. Married or single accommodation available.

St. Nicholas Hospital Management Committee

2 Locum REGISTRAR PSYCHIATRISTS (whole-time) for approximately 6 months. Married or single accommodation available.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD. HARTLEPOOLS HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PATHOLOGIST (whole-time), non-resident. Furnished or unfurnished flat available. Applications will be considered from doctors who do not necessarily intend to specialise in pathology, but desire pathological experience for 1 or 2 years. The Central Laboratory, General Hospital, West Hartlepool, is in a new building and this appointment offers good experience in pathology as applied to the clinical specialties and to general practice.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Benfield-road, Newcastle upon Tyne, 6, within 7 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. DARLINGTON HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR ORTHOPÆDIC SURGEON (whole-time), resident or non-resident. Single accommodation available. Appointment to commence 1st December, 1956.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Benfield-road, Newcastle upon Tyne, 6, within 7 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. WINTERTON HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PSYCHIATRIST (whole-time) resident. Accommodation available.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Benfield-road, Newcastle upon Tyne, 6, within 7 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. HEMLINGTON HOSPITAL, MIDDLESBROUGH. (55 plastic surgical beds.) REGISTRAR in Plastic Surgery Unit, whole-time. Duties also to be undertaken at Stockton Children's Hospital. Single accommodation may be available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Benfield-road, Newcastle upon Tyne, 6, within 7 days.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. DEPARTMENT OF NEUROLOGICAL SURGERY. The post of SENIOR HOUSE OFFICER (either resident or non-resident) is now vacant. The appointment is tenable for 12 months in the first instance.

Applications should be addressed to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, together with names and addresses of 2 referees.

NEATH GENERAL HOSPITAL, Neath. (312 Beds.) Applications are invited from pre-registration and qualified medical officers for the post of HOUSE SURGEON. Appointment available immediately and tenable for 6 months. This Hospital is recognised for the F.R.C.S. and other major diplomas and approved by the General Medical Council for Pre-registration Service under Section 11 of the Medical Act, 1950.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, Mid Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited from suitably qualified medical practitioners for the post of SENIOR HOUSE OFFICER. The Sanatorium has 138 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a new major Thoracic Surgical Unit for tuberculous and non-tuberculous diseases of the chest.

Applications, stating age, experience, and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NORTHAMPTON GENERAL HOSPITAL. (432 Beds.) Vacancies 1st October, 1956, for the following :—

SENIOR HOUSE OFFICER (general surgery).

HOUSE OFFICER (Department of Anæsthetics) ; recognised for D.A.

HOUSE OFFICER (Fracture and Orthopædic Department) ; recognised for F.R.C.S. and pre-registration.

SENIOR HOUSE OFFICER (E.N.T. Department); recognised for F.R.C.S. and D.L.O.

All 6 months appointments in the first instance.

Applications, enclosing copies of 3 testimonials, as soon as possible, to S. G. HILL, Superintendent.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Psychiatry required for Hertfordshire Child Guidance Service. The clinic, which offers a wide scope of child guidance experience, may be visited by direct appointment with the Medical Director, Child Guidance Clinic, Hill End, St. Albans. Previous child guidance training and/or experience desirable. Possession of car an advantage.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 26th October, 1956.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required SENIOR HOUSE OFFICER, duties to commence on 1st November, 1956. Salary and conditions of service in accordance with Ministry regulations. A furnished flat is available for married candidates, if required.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Duties will include work in the Casualty Department. Appointment for 1 year in the first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th October, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE SURGEON, vacant 15th November, 1956. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (casualty) duties to commence immediately. Establishment 3. Recognised for F.R.C.S. Post offers wide experience of casualty work.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Secretary, General Hospital, Nottingham.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON (pre-registration post), vacant 1st December, 1956. Recognised for the F.R.C.S. Devonport Section.

HOUSE SURGEON (pre-registration post), vacant 1st December, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Locum SENIOR MEDICAL REGISTRAR required immediately until a permanent appointment is made. Salary £24 per week in accordance with terms and conditions of service of hospital medical staff. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications, and experience, together with names of 2 referees, to Secretary, Hospital Management Committee, St. Stephen's-road, Norwich.

OXFORD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR in Psychiatry, St. John's Hospital, Stone, near Aylesbury (770 Beds). Married or single accommodation available. Appointment for 1 year, available for extension to a second year.

Application forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should be returned by 10th October, 1956.

PONTEFRACT. HEADLANDS HOSPITAL. House PHYSICIAN (Senior House Officer grade) required at above Hospital. This is a modern Geriatric Unit of 215 Beds.

Applications as soon as possible to—

D. G. DAVIES, Group Secretary,
Pontefract and Castleford Hospital Management Committee.
Great Northern House, Salter-row, Pontefract, Yorks.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Queen Alexandra Hospital**
SENIOR HOUSE SURGEON (recognised for the F.R.C.S.) (87 surgical beds), vacant now.

(2) **Royal Portsmouth Hospital**
(*a*) SENIOR HOUSE SURGEON (recognised for the F.R.C.S.) (70 surgical beds) vacant now.
(*b*) ANÆSTHETIST (Senior House Officer grade). Recognised for the F.F.A.R.C.S. Vacant 1st October, 1956.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

PRESTON (near), LANCASHIRE. WHITTINGHAM HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER. Applications are invited for this post at the largest Mental Hospital in the country where all modern treatment is undertaken, including electro-encephalography for the area. Facilities will be given for study either for the D.P.M. at Manchester University or for the M.R.C.P. at a large General Hospital a few miles away. The Hospital is well situated in a country district with easy access to Preston, Blackpool and Southport. Comfortable furnished quarters with full residential emoluments are available at a charge of £170 p.a. or alternatively a furnished or unfurnished flat can be arranged for a married man.

Applications endorsed "Medical Officer," giving details of experience and names and addresses of 3 referees, to be addressed to the Medical Superintendent, Whittingham Hospital, near Preston, and be received as soon as possible.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Area Department of Diseases of the Chest, for duty in the Reading Chest Clinic. The post offers wide experience in both tuberculous and non-tuberculous chest diseases and duties will include attendance at Prospect Park Hospital, Reading, and Peppard Chest Hospital, Henley. Facilities are available for postgraduate studies. Salary within the scale £775–£1075 p.a.

Applications, stating age and qualifications, together with names of 3 referees, should be sent to the Group Secretary, 3, Craven-road, Reading.

READING AREA HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology). Previous experience in pathology desirable, but not essential. Salary £745, less £150 board-residence.

Apply, stating age, qualifications with dates, nationality, present post, together with the names of 3 referees, to Group Secretary, 3, Craven-road, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Area Accident and Orthopædic Department. Post vacant 1st October next. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £125 board-residence.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR. Resident appointment, married quarters available. Becomes vacant 1st October. Applicants should state whether available for locum pending making of formal appointment.

Forms from Group Secretary, Redhill Group Hospital Management Committee, Earlswood Mount, Pendleton-road, Redhill, Surrey, to be returned by 15th October.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road, REDHILL. RESIDENT HOUSE SURGEON (pre-registration appointment).

Apply Hospital Secretary, naming 2 referees.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required immediately. Post not approved for pre-registration purposes.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital Romford.

SHREWSBURY. ROYAL SALOP INFIRMARY. (216 Beds.) HOUSE SURGEON, vacant 1st November, 1956. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) GYNÆCOLOGICAL HOUSE SURGEON. 50 gynæcological beds and 2 House Surgeons. Post recognised for M.R.C.O.G. Vacant 20th November, 1956.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants. Post tenable from 1st September, 1956.

Applications to Medical Superintendent.

SWANSEA HOSPITAL, Swansea. (403 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of SENIOR HOUSE OFFICER in the Gynæcological Department of the above Hospital. Vacancy 1st November, 1956.

Applications, stating age, and experience, together with copies of 2 recent testimonials, should be addressed to the Hospital Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. Department OF PATHOLOGY GROUP LABORATORY. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology and bacteriology. The work of this and the associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, to the Group Secretary at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for M.R.C.O.G.) Applications are invited for the resident post of SENIOR HOUSE OFFICER (gynæcology), vacant 1st January, 1957. Duties divided between units in charge of Professor of Obstetrics and Gynæcology, University of Sheffield, and full-time Consultant respectively.

Apply, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons for reference, to the Group Secretary, Nether Edge Hospital, Sheffield, 11, not later than 20th October.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Psychiatry required for Middlewood Hospital, Sheffield (2098 Beds). A flat (2 bedrooms) is available. D.P.M. essential. Appointment for 1 year in the first instance, reviewable annually. Opportunity for research and experience in the special branches of psychiatry available in the Hospital area.

Application forms and further details obtained from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 15th October, 1956.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications invited for the following non-resident posts :—

(*a*) REGISTRAR in General Surgery, with duties in the Urological Department. Post vacant 13th December, 1956. Closing date for applications 13th October.
(*b*) ORTHOPÆDIC REGISTRAR. Post vacant.

Applications to be sent at once.

Applications for the above posts should state age, qualifications and experience, give the names of 3 referees, and be sent to the Chief Administrative Officer, The United Sheffield Hospitals, Central Office, Royal Hospital, Sheffield, 1.

SOUTH CHESHIRE HOSPITAL MANAGEMENT COM-MITTEE. CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds and Annexe 34 Beds—Acute.)

Locum REGISTRAR (surgical) required at the above Hospital (approved for F.R.C.S.) for the month of October.

Applications, with full details, immediately, to the Group Secretary, Barony Hospital, Nantwich, Cheshire.

JUNIOR HOSPITAL MEDICAL OFFICER (anæsthetics), 3 years appointment. D.A. preferred. New operating suite to be opened shortly. Duties chiefly at general hospital and a Maternity Unit at another hospital. Hospital approved for D.A. Salary and conditions as per regulations.

Applications, giving age, details of experience, and names of 3 referees, immediately to Group Secretary, Barony Hospital, Nantwich, Cheshire.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of SENIOR REGISTRAR in Dermatology (limited amount of V.D. work involved). The post is non-resident and the main duties are at the Royal Northern Infirmary and Raigmore Hospital, Inverness. Previous experience in Dermatology is essential.

Forms of application and further particulars of the post are obtainable from the undersigned, to whom applications should be submitted by 8th October, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of SENIOR REGISTRAR in General Surgery at the Inverness Group of Hospitals. Main duties are at the Royal Northern Infirmary, Inverness.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by 15th October, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER at the Ross Memorial Hospital, Dingwall. Applicants should have previous experience in obstetrics in hospital or general practice. The post is resident and a suitable house is available.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by 15th October, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR at Bangour Mental Hospital, Broxburn, West Lothian. During the tenure of the post opportunities for interchange of duty and training at other centres in the Region may be available under joint training scheme of the South-Eastern Regional Hospital Board and the Department of Psychological Medicine of the University of Edinburgh.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 20th October, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR to the South-Eastern Regional Orthopædic Service. The duties will be mainly confined to the Royal Infirmary of Edinburgh and the Princess Margaret Rose Hospital.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 3 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 20th October, 1956. Further particulars can be obtained on application.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR to the South-Eastern Regional Orthopædic Service. The duties will be mainly confined to the Royal Infirmary of Edinburgh and the Princess Margaret Rose Hospital.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 20th October, 1956. Further particulars can be obtained on application.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Pathology based at the Royal Infirmary, Glasgow.

REGISTRAR in General and Orthopædic Surgery based at the Royal Infirmary, Dumfries.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 13th October, 1956.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Obstetrics and Gynæcology to fill a vacancy in the approved trainee establishment at the Brighton and Lewes Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 13th October, 1956.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Anæsthetics to fill a vacancy in the approved trainee establishment in the Orpington and Sevenoaks Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 13th October, 1956.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR PHYSICIAN for the Geriatric Services in the Orpington and Sevenoaks and Bromley Groups of hospitals. The Geriatric Unit at Orpington Hospital (which includes a long-stay annexe) has 300 Beds and offers excellent clinical experience in the diagnosis and treatment of acute and chronic geriatric cases and affords good opportunity for candidates studying for their membership. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 13th October, 1956.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment in the Medway and Gravesend Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 13th October, 1956.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of SECOND CASUALTY OFFICER (Senior House Officer grade) with duties in the Fracture and Orthopædic Department. Resident. Post vacant 22nd October, 1956. The post is recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the undersigned by 10th October, 1956. J. C. FIELD, Secretary.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Applications invited for HOUSE OFFICER (medical), vacant mid-October. Recognised pre-registration post.

Detailed applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (845 Beds—100 maternity, 40 gynæcological.) SENIOR HOUSE OFFICER or HOUSE OFFICER (obstetrics and gynæcology), required. Post vacant early November. Recognised M.R.C.O.G. and D.Obst.R.C.O.G.

Applications to Hospital Management Committee Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (854 Beds.) HOUSE OFFICER (general surgery), vacant nov. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications with copy testimonials to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (orthopædics) required. Recognised pre-registration post. Hospital recognised for F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SULLY HOSPITAL, Sully, Glamorganshire. Senior HOUSE OFFICER (surgical) required as soon as possible at above Hospital. (Regional Thoracic Centre, 324 Beds.) Experience gained in investigation and treatment of all chest and heart conditions.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. RESIDENT SENIOR HOUSE OFFICER (Casualty Officer). Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of years training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Nuffield Orthopædic Centre (Wingfield Morris Orthopædic Hospital), Oxford, includes large number of industrial injuries. Salary £745 p.a., less £150 p.a. for residential emoluments.

Full details and names of 3 referees, to Secretary, 7, Okus-road, Swindon, Wilts, by 10th October.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) 2 RESIDENT HOUSE PHYSICIANS required mid and end October. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton as soon as possible.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. The Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions ; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (274 Beds) and **SOUTHAMPTON GENERAL HOSPITAL** (472 Beds). SENIOR HOUSE OFFICER (E.N.T.) required beginning of October. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing Hearing Aid Centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (Recognised for the Membership and Diploma examinations of the R.C.O.G.) 3 RESIDENT HOUSE SURGEON appointments to the Gynæcological and Obstetric Unit will become vacant during October and November. A pre-registration candidate will be appointed to 1 of these posts.

Applications for these vacancies, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. (387 Beds.) Applications invited for post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant 1st November. Post tenable for 12 months in the first instance and recognised for the D.A. and F.F.A.R.C.S. National Health Service salary, less £150 p.a. for residence.

Apply, stating age, qualifications and experience, together with 3 testimonials, to the Group Secretary, Tunbridge Wells Group Hospital Management Committee, Sherwood Park, Pembury-road, Tunbridge Wells.

TUNBRIDGE WELLS (near), KENT. PEMBURY HOSPITAL, PEMBURY. (9 Residents.) Applications invited from suitably qualified practitioners for post of RESIDENT OBSTETRICIAN AND HOUSE SURGEON to Gynæcological Unit (Senior House Officer). Post vacant 1st November, 1956, for 12 months; recognised as combined post for M.R.C.O.G. Candidates should have had previous experience, intended for those working for higher examination.

Apply as soon as possible to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Applications invited for position of SENIOR HOUSE OFFICER in the Thoracic Surgery Department. Salary £745 p.a. A charge of £150 p.a. is made for accommodation.

Address written applications, giving full particulars and details of experience, &c., together with 2 names and addresses for reference, to W. BOWRING, Group Secretary, Victoria Chambers, Wood-street, Wakefield.

WAKEFIELD. THE GENERAL HOSPITAL, Park Lodge-lane. (158 Beds.) RESIDENT SURGICAL OFFICER (Senior House Officer grade) required at the above Hospital. Salary and conditions of service in accordance with national recommendations.

Application should be made to the Group Secretary, Hospital Management Committee No. 9 Wakefield A Group, 113, Northgate, Wakefield.

WARLINGHAM PARK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of REGISTRAR. Opportunity will be given for experience in all branches of psychiatry, psycho-neurosis, industrial psychiatry, delinquency and child guidance. Candidates may visit the Hospital by arrangement with the Medical Superintendent.

Application forms obtainable from Group Secretary, Warlingham Park Hospital, Warlingham, Surrey, should be returned within 14 days from the date of this advertisement.

WARRINGTON GENERAL HOSPITAL. (344 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics), Male or Female, which will become vacant on 1st December, 1956. Post recognised for D.C.H. Scale of salary £745 p.a., less £150 for residential emoluments.

Applications to be forwarded to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee,
c.o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens REGISTRAR in Thoracic Medicine required Llangwyfan Hospital immediately for approximately 6 months.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WIGAN (near). WRIGHTINGTON HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required (resident or non-resident). Manchester Regional Centre for orthopædic tuberculosis. 200 adults and 100 children. Salary £775–£50–£1075 p.a.

Apply to Secretary with 2 references.

WIGAN (near). WRIGHTINGTON HOSPITAL. Senior HOUSE OFFICER required (resident or non-resident). Regional Centre for orthopædic tuberculosis. 200 adults and 100 children. Salary £745 p.a.

Apply to Secretary with 2 references.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (313 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post recognised F.R.C.S. Wide experience available under Area Orthopædic team. Appointment for 6 months in first instance. Vacant 4th November.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (313 Beds.) HOUSE OFFICER (anæsthetics). Post vacant 10th November. The Hospital is recognised for the F.F.A.R.C.S. and D.A.

Applications, with copies of 2 testimonials, to the Group Secretary.

WOLVERHAMPTON AND MIDLAND COUNTIES EYE INFIRMARY. SENIOR HOUSE OFFICER required for October. 100 Beds and busy Outpatient Department. Recognised for F.R.C.S. and D.O.M.S. examinations.

Applications to Secretary, Eye Infirmary, Compton-road, Wolverhampton.

WOLVERHAMPTON GROUP. The Royal Hospital, WOLVERHAMPTON. REGISTRAR in Orthopædic and Traumatic Surgery. All types of traumatic and orthopædic conditions. Industrial accident work and rehabilitation at special unit of 60 Beds.

Applications, giving full particulars of age, qualifications, and experience, by 12th October, to Group Secretary, The Royal Hospital, Wolverhampton.

WOLVERHAMPTON. NEW CROSS HOSPITAL. (627 Beds.)

Pre-registration HOUSE OFFICER in Medicine, vacant 15th October.

Pre-registration HOUSE OFFICER in General Surgery, vacant 31st October.

Applications to Hospital Secretary.

DUBLIN. ROYAL VICTORIA EYE AND EAR HOSPITAL, Adelaide-road, DUBLIN. EAR, NOSE AND THROAT DEPARTMENT. A vacancy for a HOUSE SURGEON (E.N.T. Department) will occur on 1st January, 1957. Salary £275 p.a.

Applications to be sent to the Registrar at above Hospital not later than 31st October, 1956.

DUBLIN. ROYAL VICTORIA EYE AND EAR HOSPITAL, Adelaide-road, DUBLIN. EYE DEPARTMENT. A vacancy for a HOUSE SURGEON (Eye Department) will occur on 1st January, 1957. Salary £275 p.a. Hospital recognised for D.O.M.S.

Applications, enclosing testimonials, to be sent to the Registrar at above Hospital not later than 31st October, 1956.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for the following whole-time post for the year commencing 1st October, 1956.

REGISTRAR in Psychiatry at Downshire Hospital Downpatrick (a mental hospital).

The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 13th October, 1956.

Public Appointments

CHESHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointment as SENIOR ASSISTANT MEDICAL OFFICER on the County Medical Staff. The work will be concerned mainly with children under 5 years of age, and will include assistance in supervising child-welfare centres and the work of the health visitors. A knowledge of mental ill-health and its prevention in young children will be an advantage. The appointment is superannuable and subject to medical examination. The salary scale will be that applicable to Assistant Medical Officers, plus £125 at all stages—i.e., £1175–£50–£1325–£55–£1600. Previous experience will be taken into consideration, and car and subsistence allowance will be paid according to the County Scale.

Forms of application may be obtained from the undersigned, to whom they should be returned by 20th October, 1956.

ARNOLD BROWN, County Medical Officer.

24, Nicholas-street, Chester.

DERBYSHIRE COUNTY COUNCIL. Appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH for the Derbyshire County Council and MEDICAL OFFICER OF HEALTH for the Borough of Ilkeston and the urban districts of Alfreton, Heanor and Ripley. Applications are invited from Male or Female registered medical practitioners holding a Diploma in Public Health or an equivalent qualification for the above-named permanent "mixed" appointment. The total inclusive salary scale will be £1936 2s. 9d. p.a.–£57 0s. 11d. (3)–£58 15s. 0d. (1)–£55 2s. 3d. (1)–£18 15s. 0d. (3)–£2277 7s. 9d. p.a. A car allowance is payable. The person appointed will be directly responsible to the Councils of the Borough of Ilkeston and the Urban Districts of Alfreton, Heanor and Ripley for the proper performance of all the duties of a Medical Officer of Health for those areas respectively. As Assistant County Medical Officer he will be concerned under the direction of the County Medical Officer of Health with decentralised supervision required under the National Health Service, as well as work in connection with the School Health Service, attendance at clinics, and such other duties as may be required. The person appointed may be required to reside in the area of the District Councils. Sympathetic consideration will be given to the provision of housing accommodation if required. The officer must not engage in private practice, and must devote the whole time to the duties of the before-mentioned posts. The appointment is subject to the provisions of the Local Government Superannuation Acts, 1937/53. The successful candidate will be required to pass a medical examination. Canvassing, either directly or indirectly, will be a disqualification.

Application forms may be obtained from the undersigned, to whom they should be returned so that they are received not later than 15th October, 1956.

J. B. S. MORGAN, County Medical Officer of Health.

County Offices, Derby.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1

District	*County*	*Latest date for receipt of applications*
MALTON ..	YORK	13TH OCTOBER, 1956
DARLASTON ..	STAFFORD ..	13TH OCTOBER, 1956
SHERBURN ..	YORK ..	13TH OCTOBER, 1956

GLASGOW. CORPORATION OF GLASGOW. Health AND WELFARE DEPARTMENT. Applications are invited from qualified medical Women for the post of ASSISTANT MEDICAL OFFICER (maternity and child welfare). Applicants should have hospital experience both in obstetrics and diseases of children, and should hold the Diploma in Public Health. Salary —£1050–£50/£55–£1475 p.a. The post is superannuable, subject to a medical examination.

Applications, stating age, qualifications, and full details of training and experience, together with names of not more than 3 referees, should be lodged with me in an envelope marked "Appointment—Assistant Medical Officer, Maternity and Child Welfare" by 13th October, 1956.

City Chambers, Glasgow. WILLIAM KERR, Town Clerk.

GOVERNMENT OF BRUNEI (Borneo). Lady Medical OFFICER required for general medical, surgical and obstetrical duties. Work will be based on hospitals or health clinics with occasional short tours of 1–5 days. Climate moist and equable and fairly healthy. No income-tax. Candidates must possess qualifications registrable in the United Kingdom.

Appointments as follows :—

(*a*) From the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of salary after the engagement ; or

(*b*) On contract for 3 years in first instance renewable in 3 year periods up to total of 12 years, with bonus (taxable) ranging from £100 to £150 a year on completion of service.

Salary scale, including expatriation pay, $885–$1435 a month (£1239–£2009 a year). Starting salary depends upon qualifications and experience. Cost-of-living allowance according to salary also payable. Partly furnished quarters provided at low rental. Free passages. Generous home leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/22/04).

GOVERNMENT OF BRITISH GUIANA. Medical Superintendent required to take charge of Mental Hospital at Berbice, to supervise staff, patients, revenue and expenditure, and the psychiatric clinic held monthly at Georgetown.

Appointment as follows :—

(*a*) On contract for 3 years with gratuity (taxable) of 22½% of basic salary payable at 6 monthly intervals or in lump sum on completion of engagement, or (*b*) from the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights (up to 6 years) and receive a gratuity (taxable) of 20% of aggregate salary after engagement.

Salary £1800 a year plus allowance of £250 a year in lieu of consultation fees. Private practice not permitted. Income-tax at local rates. Free unfurnished quarters provided. Generous leave. Free passages for Officer, wife, and children under 18, not exceeding 5 persons in all, on appointment and completion of engagement. Candidates must possess medical qualifications registrable in United Kingdom, hold a Diploma in Psychological Medicine and have had 2 years experience in mental hospital.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/30/05).

GOVERNMENT OF TRINIDAD. Medical Officers required primarily for duties in the Mental Hospital. Appointments on permanent basis with pension (non-contributory). Candidates from the National Health Service may retain their superannuation rights during their time in Trinidad (up to 6 years) and receive a gratuity (taxable) of 20% of the aggregate of their salary on leaving oversea employment. Salary scale B.W.I. $6720–$7200 (£1400–£1500) a year. Pension 1/600th of final pensionable emoluments for each completed month of service. Quarters provided at low rental or allowance payable in lieu. Free passages on first appointment for Officer, wife, and dependent children under 18 years, not exceeding 5 persons in all and on leave up to maximum of 3 adult fares. Income-tax at local rates. Generous leave. Educational facilities available. Candidates must possess qualifications registrable in United Kingdom also Diploma in Psychological Medicine and 3 years postgraduate experience of psychological medicine, 2 of which should have been spent working in a mental hospital.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/38/05).

GOVERNMENT OF SEYCHELLES. Medical Officers with experience of major surgery required for general duties in Seychelles. Appointment on permanent basis, with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service, or on short-term contract with gratuity (taxable) payable on completion of engagement. Candidates in National Health Service may leave but retain their superannuation rights during time overseas (up to 6 years) and receive gratuity (taxable) of 20% of aggregate of salary on leaving oversea employment. Salary scale £885–£1231 10s. a year. Starting salary according to qualifications and experience. Temporary, variable, non-pensionable cost-of-living allowance also payable subject to maximum allowance of £121 10s. a year. Income-tax at local rates. Private practice not permitted. Quarters, at rental of 10% of basic salary up to a maximum of £11 5s. a month. Free passages provided for Officer, wife, and family up to cost of 3 adult fares. Generous leave. Candidates must possess medical qualifications registrable in United Kingdom.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/54/02).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—BRITISH HONDURAS. MEDICAL OFFICERS required for general duties. Appointments can be made on permanent basis with pension (non-contributory), or on short-term agreement renewable if desired. Arrangements can probably be made for doctors in the National Health Service to leave the service but retain their superannuation rights up to 6 years and receive gratuity (taxable) of 20% of aggregate of their salary after engagement. Salary scale £810–£1200 a year at current rate of exchange of British Honduras dollar ($4 = £1). Private practice in district towns permitted, but in Belize an allowance of £125 a year payable in lieu. Quarters available at rental of 7½% of salary, subject to maximum charge of £120 a year. Main items of furniture provided at rental of 6% a year of value of each item supplied. Income-tax at local rates. Free passages on appointment for Officer, wife, and children, not exceeding 5 persons in all. On leave, passages for Officer and wife, and not more than 2 children. Local leave permissible and generous home leave granted after each tour of from 2 to 3 years. Candidates must possess medical qualifications registrable in the United Kingdom.

Application forms from the Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting No. BCD.117/31/01).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—MAURITIUS. MEDICAL OFFICER OF HEALTH required to deal with all matters affecting the health of the district assigned to him ; coördinate the activities of the Social and Health Services ; direct the work of all sanitary staff in the district ; and assist in the training of local health staff. Candidates must have medical qualifications registrable in the United Kingdom and possess the D.P.H. Appointment on permanent basis with pension (non-contributory) or on contract (with gratuity) for 3 years. Salary scale Rs.11,700 – Rs.19,020 (£877 10s.–£1426 10s.) p.a. Temporary non-pensionable cost-of-living allowance of 11% on salary not exceeding Rs.12,000 (£900) p.a. and 8% on salary over Rs.12,000 (£900) p.a. Gratuity of £37 10s. for each completed period of 3 months while salary is below £1000 a year and £50 when salary is over £1000 a year. Government of Mauritius would pay employer's share of pension contributions (if applicable). Quarters not provided, but Officers who have not been allocated Government houses will be reimbursed any difference between approved rent paid for a private house (subject to a maximum of Rs.250 (£18 15s.) a month) and the 10% salary they would normally pay for a Government house. For this purpose, Officers in hotels will be regarded as paying half, for the first 21 days, and then quarter of board and lodging charge for themselves and wives in respect of rent. Income-tax at local rates. Free passages in both directions for Officer, wife and children not exceeding 5 persons in all. Generous home leave after each tour of 3 or 4 years.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (reference No. BCD.117/52/02).

HER MAJESTY'S OVERSEA SERVICE. Medical Branch —TANGANYIKA. MEDICAL OFFICERS with qualifications registrable in United Kingdom required for general duties. Officers would normally be based on a hospital but must be prepared to tour and to assist in training African staff. 1 vacancy is for an officer possessing F.R.C.S., or equivalent ; he would be regarded as available for general medical duties but would be allotted surgical work as far as possible. Appointments can be made on permanent basis with pension (non-contributory), or on short-term contract with gratuity (taxable) payable on satisfactory completion of service. A doctor in National Health Service may leave the National Health Service but retain his superannuation rights (up to limit of 6 years) and receive a gratuity (taxable) of 20% of his aggregate salary after engagement. Salary ranges from £1284 to £2115 a year, starting point determined by experience. 4 extra increments given to successful candidates possessing approved higher qualifications. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Tanganyika and other territories in medical administration or, if they possess higher qualification and suitable experience, in specialist posts. Quarters at rental varying from £30 to £78 a year according to size and type, and furniture at rate varying from £12 to £24 a year. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 30 to 36 months. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting No. BCD. 117/8/02).

GOLD COAST LOCAL CIVIL SERVICE. Ministry of HEALTH, GOLD COAST. MEDICAL OFFICERS for Medical Field Units. Medical Officers (single or married) required. Possession of D.T.M. & H. and previous tropical experience desirable but not essential. Selected candidates may be required to do D.T.M. & H. course before leaving for Gold Coast in which case fees and an allowance will be paid. Work consists of control of endemic and epidemic disease by field survey and mass treatment. Medical Officers are normally in sole charge of a Unit working in an area of many hundreds of square miles and consisting of some 50 lay assistants under direct supervision. House provided at every Field Unit headquarters but considerable travelling is necessary. Most travelling is done in Officer's own car for which generous maintenance and mileage allowances are paid. As Field Units operate almost exclusively in remote areas with few social amenities officers of adventurous spirit who can make their own leisure amusements are best suited. Work offers great scope for field research into largely unknown epidemiological problems and is likely to appeal to men with inclination towards preventive medicine who enjoy active life.

Appointment is to Gold Coast Local Civil Service and may be :

(*a*) Contract for 2 tours of duty of 18–24 months with gratuity (taxable) of £12 10s. for each completed month of service.

(*b*) 3 years probation for permanent and pensionable employment. Pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of service ; or

(*c*) Doctors in National Health Service may leave National Health Service but retain their superannuation rights while in the Gold Coast (up to 6 years) and receive on termination of engagement a gratuity (taxable) of 20% of their Gold Coast salary.

Salary under (*a*) from £1330 to £2310 a year and under (*b*) and (*c*) £1055 to £1850 a year, starting point being determined by qualifications and experience. Temporary addition of £29 15s. a year also payable.

Quarters at rental not exceeding £150 a year. Income-tax at local rates. Free passages for Officer, wife, and up to 3 children under 13 years of age. Annual local leave permissible and generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/13/04).

MANCHESTER CORPORATION HEALTH DEPARTMENT. ASSISTANT MEDICAL OFFICER required for duties mainly concerned with the City Council's schemes for immunisation and vaccination. Salary £1050–£50–£1200–£55–£1475. Medical Council "C" conditions of service.

Application forms (returnable by 13th October, 1956) from the Town Clerk, Town Hall, Manchester, 2.

MANCHESTER EDUCATION COMMITTEE. Medical OFFICERS are required for work in the School Health Service. Salary £1050–£1475. Preference given to candidates with experience in children's diseases and retinoscopy and holding D.P.H. or D.C.H.

Application forms and particulars (stamped addressed envelope) from Chief Education Officer, P.O. Box 480, Manchester, 3, returnable to the Town Clerk, Town Hall, Manchester, 2, by 27th October, 1956. Envelope to be endorsed School Medical Officer.

LEEDS. CITY OF LEEDS. Public Health Department. Applications are invited from qualified and registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER for Maternity and Child Welfare. Applicants should have had postgraduate experience, preferably including obstetrics, antenatal work, and pædiatrics. The salary scale is £1050–£50(3)–£1200–£55(5)–£1475 p.a. The person appointed will be required to pass a medical examination and to contribute to the Superannuation Fund.

Application forms and particulars of the duties may be obtained from the undersigned at the Public Health Department, 25, East-Parade, Leeds, 1, and completed applications should be returned by 10 A.M. on Monday, 22nd October, 1956. Canvassing in any form, either directly or indirectly, will be a disqualification I. G. DAVIES, Medical Officer of Health.

SOUTHERN GAS BOARD. Applications are invited for the new and pensionable post of Whole-time ASSISTANT MEDICAL OFFICER. Previous experience in industrial medicine would be an advantage. The salary will be on Senior Staff scale, Grade D, £1375–£1575, or Grade E, £1525–£1725, or by arrangement with the successful applicant. The successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required to join the Board's Staff Pension Scheme.

All applications must be made on a form which may be obtained from the Personnel Manager, Southern Gas Board, 164, Above Bar, Southampton, and completed forms should be returned by Monday, 22nd October, 1956.

P. VALON BENNETT, Personnel Manager.

SURREY COUNTY COUNCIL. Child Guidance Service. Appointment of Part-time PSYCHIATRIST (4 sessions per week). Applications are invited from medical practitioners for an appointment in the Guildford, Farnham, Godalming area. Candidates should possess the D.P.M. and have had previous experience of child guidance work. Remuneration at the rate of 4 guineas per session.

Applications, stating age, qualifications, and experience, with the names of 2 referees, to the County Medical Officer, County Hall, Kingston upon Thames, by Saturday, 6th October, 1956.

THE REPUBLIC OF THE SUDAN. The Ministry of Health invite applications for the post of SURGICAL SPECIALIST. Candidates must possess the necessary professional qualifications—viz., F.R.C.S. or its internationally recognised equivalent. Age between 28 and 48. Salary range £E1750–£E2330 (for Junior Specialists) or a flat £E2330 for Specialists. Candidates for this post may apply for secondment from the National Health Service for a period of up to 3 years under the terms of the circular letter No. RHB/(52)106EG(52)101 of 30th September, 1952. The appointment will be on a short-term contract for a period up to 5 years. Starting salary will be determined according to age and qualifications. A bonus of 1 months salary for each completed year of satisfactory service will be payable and an outfit allowance of £E50 on signature of contract.

Further particulars and application form can be had on application to Dr. E. P. PRATT, 137, Harley-street, London, W.1.

WESTMINSTER CITY COUNCIL AND HOLBORN BOROUGH COUNCIL. Joint appointment of PRINCIPAL ASSISTANT MEDICAL OFFICER OF HEALTH (permanent superannuable post). Salary £1515–£55–£1680 p.a. Applicants to be registered medical practitioners and to hold a registered Public Health qualification; age not to exceed 45 years. The person appointed will act as Principal Assistant Medical Officer of Health for the 2 Boroughs. His services will be allocated in the proportion of three-fourths to Westminster and one-fourth to Holborn.

Further particulars from and applications (marked "Principal Assistant Medical Officer of Health") stating age, war service, qualifications, present and past appointments, with copies of 3 recent testimonials, to the Town Clerk, Westminster City Hall, Charing Cross-road, W.C.2, by 12th October, 1956.

YORKSHIRE. COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE. Applications are invited from registered medical practitioners, Men or Women, for the post of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER in the Hemsworth area of the County. The Assistant will be on the staff of the County Medical Officer's Department but will work under the administrative direction of the Divisional Medical Officer for the area. The duties will be mainly clinical in the School Health and Infant Welfare Services, but other health duties may be included by the Divisional Medical Officer. The scale of salary is £1050–£1475 p.a. A minimum of 3 years experience since qualification is desirable and the possession of a Diploma in Child Health will be an advantage. Travelling and subsistence allowances according to the County Council's scale are payable in addition to salary. The post is superannuable and the successful applicant will be required to pass a medical examination as to physical fitness.

Forms of application can be obtained from the undersigned, to whom they should be returned not later than 13th October, 1956. J. WOOD-WILSON, County Medical Officer.

County Hall, Wakefield.

NORFOLK COUNTY COUNCIL. Applications are invited from registered medical practitioners holding the Diploma in Public Health for appointment as SENIOR ASSISTANT MEDICAL OFFICER on headquarters staff. In addition to administrative work, the duties will include the medical examination of staff and deputising for other medical officers. The salary scale (subject to Council approval) will be £1343 10s.–£52 10s.–£1606. Travelling and subsistence allowances will also be paid.

Application forms, together with further particulars of the post, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed applications should be sent not later than 8th October, 1956.

Hospital Services : Non-Medical Appointments

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a full-time appointment of a NON-MEDICAL BIOCHEMIST at the Liverpool Royal Infirmary. The successful applicant who will be included in the Basic or Senior grade according to qualifications and experience, will be required to work under the Consultant Pathologist and to perform biochemical estimations and examinations in the Clinical Pathology Laboratory of the Royal Infirmary and of other hospitals in the group. Conditions of service are as laid down by the Whitley Council, salary in the senior grade being on the scale £910–£40–£1230 p.a. For consideration for appointment to the senior grade applicants should normally have had at least 5 years experience in a post in the basic grade.

Apply by the 20th October, 1956, with details of age, qualifications and experience and the names of 3 referees, to the Secretary, 80, Rodney-street, Liverpool, 1.

Miscellaneous

Evans Medical Supplies Ltd. invite applications from Male, registered medical practitioners, having specialised knowledge in bacteriology, for the post of Bacteriologist at The Evans Biological Institute, Runcorn, Cheshire. This senior position should appeal to Medical Bacteriologists who are technically interested in the research into and the manufacture of immunological products for therapeutic purposes. The terms and conditions of service will not be inferior to those which maintain in the National Health Service.

Applications, giving full particulars of age, qualifications, and experience, should be forwarded to The Medical Director, THE EVANS BIOLOGICAL INSTITUTE, Runcorn, Cheshire.

Upjohn of England Ltd., conducting extensive research requires the services of a fully qualified Physician to head its newly created Medical Department. Young men with interest in clinical investigation and research are invited to reply. Interviews by Parent Company (U.S.A.), Medical Director, will be held for a limited time.—Apply: Upjohn of England Ltd., 4, Aldford-street, Park-lane, London, W.1.

Medical Officer required by large Oil Company for service initially based on London but entailing overseas tours of duty and eventually for permanent service in the Middle East. Preference will be given to bachelors under 37 with overseas experience and some knowledge of tropical work. Salary commensurate with qualifications and experience, but not less than £1200 p.a. whilst in U.K. Pension scheme.—Write quoting No. 646 to BOX No. 405, c/o CHARLES BARKER & SONS LTD., Gateway House, London, E.C.4.

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